VO 54 THIRD SERIES NUMBER 4 JANUARY 29 1947

THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

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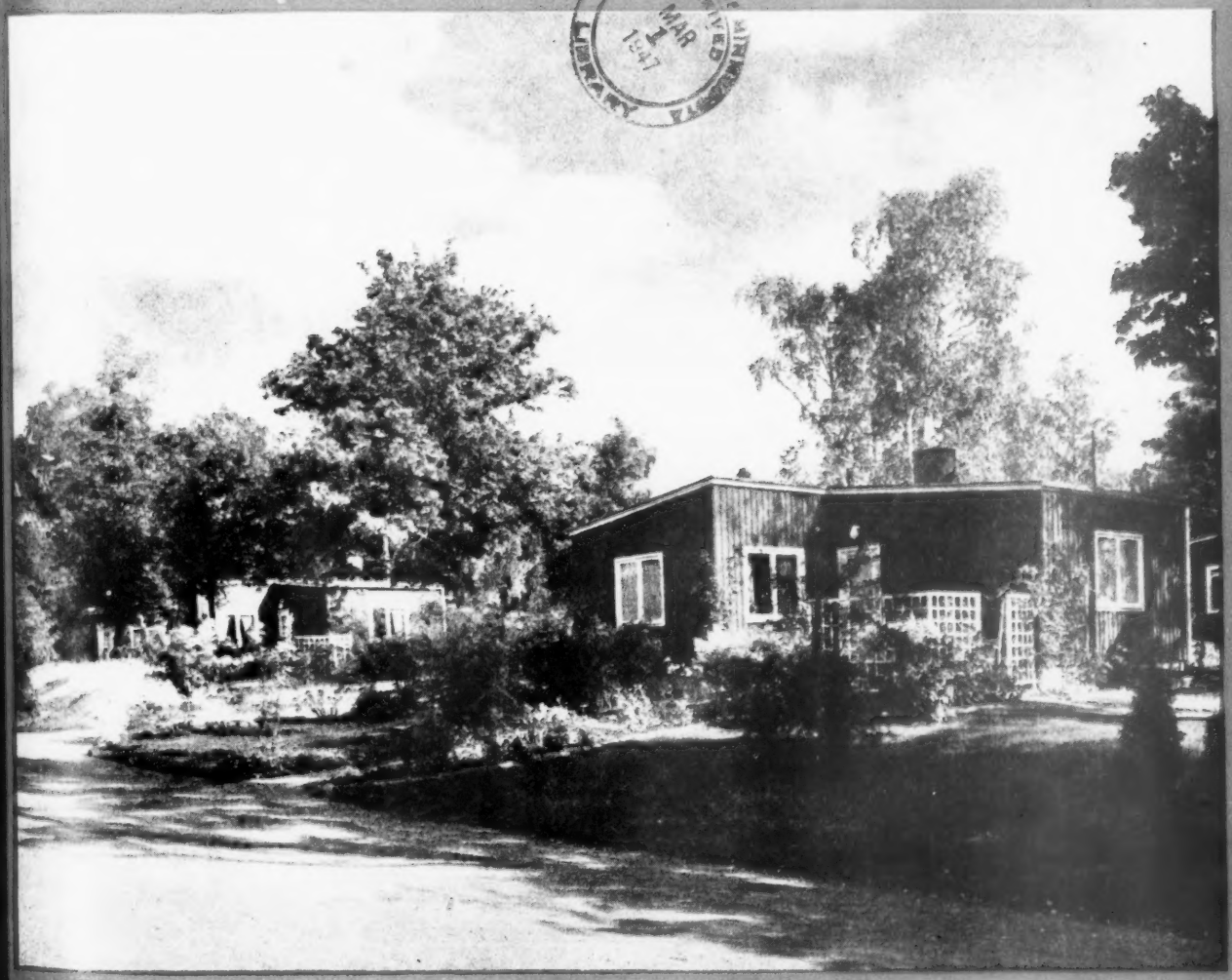

JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

3rd Series No. 4] 29 JANUARY 1947 [Vol. 54

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Journal

New Year's Honours

Sir Ernest Simon [*Hon. A.*] has been created a Baron in the New Year's Honours List; Sir Alfred Munnings, P.R.A. [*Hon. F.*] and Mr. Evelyn Shaw, C.V.O. [*Hon. A.*] have been made Knights Commander of the Victorian Order; and Mr. F. Jackman [*F.*], Senior Architect, Ministry of Education, and Mr. E. M. Joseph [*F.*], lately Director of Works and Buildings, N.A.A.F.I., have been made C.B.E. Mr. Malcolm W. Matts [*L.*] is created an M.V.O.

In addition to the above, we can express our pleasure at the distinctions conferred upon the following who, though non-members, are good friends of architects and the R.I.B.A.:—

Knight Bachelor: Mr. E. G. Savage, Education Officer to the London County Council.

K.C.B.: Mr. H. C. Emmerson, Permanent Secretary, Ministry of Works.

C.B.: Mr. H. E. Aldington, Chief Highway Engineer, Ministry of Transport.

O.B.E.: Mr. J. T. B. Sandercock, Vice-Chairman, National Federation of Building Trades Operatives.

R.I.B.A. War Memorial

The Council have appointed a special Sub-Committee to submit proposals for a war memorial to commemorate members and Students who lost their lives in the recent war. The Committee consists of:

Mr. J. Murray Easton (Vice-President), Chairman.
Mr. H. T. Cadbury Brown [*A.*].
Mr. R. Gordon Brown [*A.*].
Mr. G. Grey Wornum [*F.*].

It is proposed to include the names of civilian members and students who lost their lives as a result of enemy action as well as those serving in the armed forces.

In order to ensure that our records are as complete as possible members are asked to send the Secretary, R.I.B.A., details of any members or students whose names should be included, particularly of those whose names have not already appeared in the lists published from time to time in the JOURNAL.

Social Activities

In view of the present heavy demands on the use of the building, and owing to catering difficulties, it has been reluctantly decided to defer any decision on this matter for another six months. It has been found extremely difficult to arrange catering facilities for such official functions as the annual dinner, reception, etc., to which the Institute is already committed. Members are assured that every endeavour will be made to re-start social activities, especially dances, as soon as this can be done.

Members' Room at the R.I.B.A.

Another stage in the conversion of the R.I.B.A. building from war-time austerity has been reached by the opening of a lounge for members in the Reception Room on the first floor. The old Members' Room on the second floor has had to be used as a typists' room owing to the ever-growing pressure on office space. When the Library moved from its war-time quarters in the Reception Room, it was decided to devote the room so freed to the use of members. The room has been cleaned, and the furniture from the old Members' Room, which showed signs of its twelve years' use, has been re-upholstered. Magazines will be available, but unfortunately the rationing situation does not yet permit teas to be served, as was the custom before the war.

Lectures on Office Organisation

The third lecture in the series on Office Organisation will take place on Tuesday, 4 February 1947 at 6.30 p.m. The subject is "Partnership and Profit-Sharing" and the speakers will be Mr. G. Grenfell Baines [*A.*], Mr. Raglan Squire [*F.*] and Mr. H. V. Lobb [*F.*], who will take the chair.

The last of the informal talks in this series will be held on Thursday, 27 March at 6.30 p.m. The subject will be "Architects to Public Authorities" and the following members will be speaking: Mr. Hubert Bennett [*F.*], County Architect, West Riding of Yorkshire; Mr. D. E. E. Gibson [*A.*], Architect to the City of Coventry; and Mr. Kenneth Campbell [*A.*], Miners' Welfare Commission. Mr. R. H. Matthew [*A.*], Architect to the London County Council, will take the chair.

At both these lectures a buffet will be available from 6 to 6.30 p.m. for the convenience of members coming straight from their offices. Reprints of the first lecture in the series are available, price 6d.

The Journal Cover

It is regretted that the designation of the photograph on the 13 January, R.I.B.A. JOURNAL, was inadvertently omitted. The subject was the article on Czechoslovak Architecture by Jaromír Krejcar and the cover illustration was a week-end house near Brno, Architect J. Polásek.—1934.

The photograph on the cover of this number is of Swedish co-operative prefabricated housing.

The A.B.S. and Architects' Offices

The Architects' Benevolent Society now has available special collecting boxes, for use in architects' offices and architectural departments for the collection of small contributions, on the lines of the Penny-a-Week scheme operated by the Red Cross during the war. This should appeal to many who are unable to subscribe a large amount, but who can spare a small sum to form part of a local or office total.

Architects who wish to help the Society by taking one or more of these collecting boxes should write to the Secretary, A.B.S., 66, Portland Place, W.1, stating how many boxes they require, and the approximate number of architectural staff in their office.

A.B.S. Appeal

Up to 22 January 1947, the total received in answer to the President's Half-Crown Christmas Appeal is £847 19s. 4d. (6,773 half-crowns). This represents 1,023 contributors, of amounts ranging from 2s. 6d. to £50.

Among the larger donations are the following :

£50 os. od.	Ernest Bates
£25 os. od.	Digby L. Solomon
£21 os. od.	Sir Banister Fletcher
£10 10s. od.	Sir Lancelot Keay
	A. T. Scott
£10 os. od.	J. H. Belfrage
	H. V. Lobb
£6 6s. od.	Minoprio and Spencely
£5 5s. od.	R. Atkinson
	R. A. Cornell
	S. Gordon Jeeves
	E. P. Morgan
	R. Phillips
	H. T. Seward
£5 os. od.	Anonymous
	R. C. Ball
	B. Ionides
	J. Leathart
	R. le R. White
	Messrs. Wilson and Mason

The A.B.S. is most grateful for all the contributions received, and would like to remind all those who were too busy at Christmas-time to deal with such matters, that the Fund will remain open a little longer.

John D. Crace

The death at the age of 101 of the widow of John D. Crace recalls the memory of an Honorary Associate who enjoyed, in his time, a great reputation as an expert on architectural colour. Crace did polychrome decoration at the British Museum, National Gallery, Skinners' Hall, Fishmongers' Hall, etc., and was the author of several books on colour in architecture.

British Architecture in Turkey

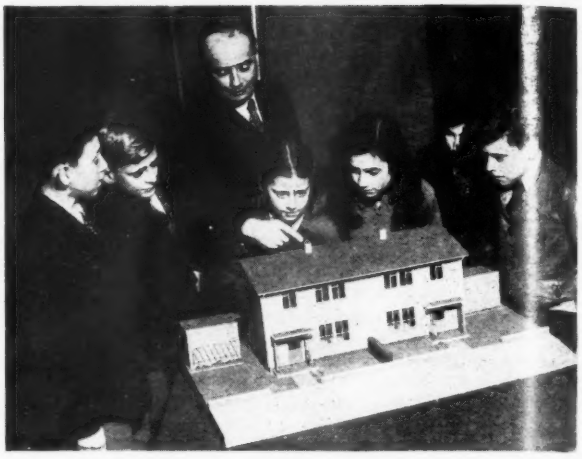
The British Council has sent the "Replanning Britain" Exhibition to Turkey, with the addition, at the special request of the Turkish authorities, of models and illustrations of British sports stadia. The exhibition is opening at Ankara on 24 January and will later visit Istanbul and other cities.

The exhibition has been shown in recent months in Sweden, Finland, Denmark and Holland. It consists of photographs, maps, plans and models illustrating British planning schemes, including those for London, Manchester, Coventry, Stevenage, etc.

While the exhibition is in Turkey, Mr. A. M. Chitty [*F.*] will give lectures on British planning and housing developments. Mr. Chitty took with him letters conveying the good wishes of the Royal Institute to the Turkish architectural societies.

The Christmas Holiday Lectures

The continued success over many years before the war of the Christmas Holiday Lectures to Boys and Girls and their revival



this year needs no comment in this column. This year the lectures were given by Mr. G. A. Jellicoe [*F.*] and there was an increased attendance at each successive lecture which said much for the wise choice of lecturer. Mr. Jellicoe talked to them about architecture, the subjects being "Architecture: What It Means, How it affects you at Home, at School, at Play," and Mr. Jellicoe had the happy knack of making his subject come true and relating it intimately to the everyday world. The children obviously enjoyed the slides he showed them, and the general manner in which he approached the problems he discussed.

The Times Educational Supplement recently paid tribute to the educational value of lectures by learned societies to the citizens of to-morrow.

West Riding Advisory Planning Committee

The Minister of Town and Country Planning has appointed a West Riding Advisory Planning Committee to co-ordinate the planning schemes prepared by the Statutory Authorities for the purpose of arriving at an agreed Advisory Outline Plan for the West Riding. The Advisory Committee has elected a Technical Committee to undertake the preparation of an Outline Plan and Report.

The area for which the Outline Plan will be prepared covers 1,785,762 acres and includes 11 County Boroughs, 11 non-County Boroughs, 57 Urban Districts and 21 Rural Districts, having a total population of three and a half million.

Mr. Kenneth O. Male, West Riding County Planning Officer, is Executive Officer to the Advisory Committee.

R.I.B.A. Diary

Tuesday, 4 Feb. 6.30 p.m. Lecture Discussion. *Office Organisation. Partnership and Profit Sharing.* Speakers: G. Grenfell Baines [*A.*], Raglan Squire [*F.*] and H. V. Lobb [*F.*].

Wednesday, 5 Feb. 6 p.m. A.S.B. Lecture. *Noise Abatement.* Hope Bagenal, D.C.M. [*F.*].

Tuesday, 11 Feb. 6 p.m. General Meeting. President's address to Students. Presentation of Medals and Prizes.

Tuesday, 25 Feb. 6 p.m. General Meeting. *Urban Housing—Planning for Amenity.* Edward Armstrong [*F.*].

Friday, 21 March. 7 for 7.30 p.m. The Annual Dinner at the R.I.B.A.

Thursday, 27 March. 6.30 p.m. Lecture Discussion. *Office Organisation; Architects to Public Authorities.* Speakers: Hubert Bennett [*F.*], D. E. E. Gibson [*A.*], and Kenneth Campbell [*A.*].

Tuesday, 15 April. 6 p.m. General Meeting. Presentation of Royal Gold Medals for the War Years.

Tuesday, 6 May. 6 p.m. Annual General Meeting.

HEAVENLY MANSIONS:

AN INTERPRETATION OF GOTHIC

BY JOHN N. SUMMERSON, B.A. (Arch.), F.S.A. [*A*]

A PAPER READ BEFORE THE ROYAL INSTITUTE OF BRITISH ARCHITECTS ON TUESDAY, 10 DECEMBER, 1946

The President in the chair

One kind of play common to nearly every child is to get under a piece of furniture or some extemporised shelter of his own and to exclaim that he is in a "house." Freud showed, many years ago, that this kind of play is associated with an unconscious wish to return to the inactive security of the womb.* I am not, however, concerned with the psycho-analytic aspects of the matter except in so far as they show that this particular kind of play cannot be dismissed merely as mimicry of the widespread adult practice of living in houses. It is symbolism—of a fundamental kind, expressed in terms of play. It is a kind of symbolism which has a great deal to do with the æsthetics of architecture.†

At a later stage, the child's conduct of the game becomes more realistic; he constructs or uses doll's houses and insists on a strict analogy between his own practices and those of adult life—the doll's house must be an epitome of an adult's home. But whether the child is playing under the table or handling a doll's house, his imagination is working in the same way. He is placing either himself or the doll (a projection of himself) in a sheltered setting. The pleasure he derives from it is a pleasure in the relationship between himself (or the doll) and the setting.

None of us ever entirely outgrows the love of the doll's house or, usually in a vicarious form, the love of squatting under the table. Camping and sailing are two adult forms of play closely analagous to the "my house" pretences of a child. In both, there is the fascination of the miniature shelter which excludes the elements by only a narrow margin and intensifies the sense of security in a hostile world. Less direct but even more common is the liking for models and houses in miniature. Most people here will remember the enormous popularity of the Queen's Dolls House, shown for charitable purposes about fifteen years ago. The tiny cottage presented by the people of Wales to Princess Elizabeth exercised a similar appeal. The concept of the diminutive in building exercises a most powerful fascination. The "little house" is a phrase which goes straight to the heart, whereas "the big house" is reserved for the prison and the public assistance institution. Pleasure-houses of any kind often take their names from diminutives. "Casino," "Bagatelle," "brothel" are all diminutive words. The "love-nest," "love in a cottage," the "little grey home in the West," the "bijou residence"—all such hackneyed phrases serve to remind us how deep is the appeal of "the little house."

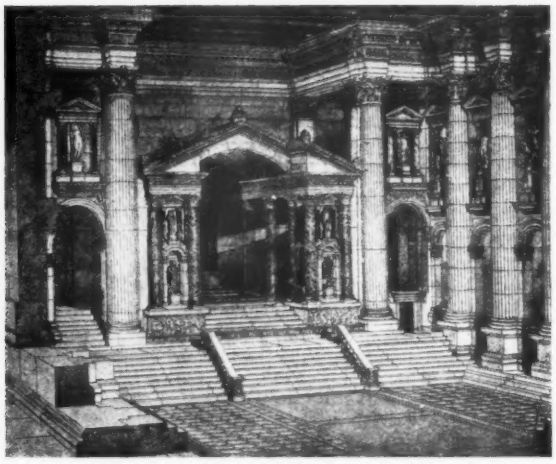
But we must be careful to keep separate two different manifestations of this appeal. There is the "cosiness" of the little house; but also its ceremony. It is the "cosiness" which psychologists underline in their interpretation of its symbolism. But for us the ceremonial idea is more important—the idea of neatness and serenity within, contrasting with wildness and confusion without. The ceremony of the child's house, like its cosiness, is found again in adult play—that grave form of play which is intertwined with religious and social customs. The baldachino, the canopy over a throne, the catafalque over a tomb, the ceremonial shelter carried over a pope or bishop in a procession—these are not empirical devices to exclude dust or rain but vestiges of infantile regression such as we have just observed.

It is precisely this feeling for the ceremony of the little house which links all that I have been saying with the development of architecture. The Latin word for a building is *aedes;* the word for a little building is *aedicula* and this word was applied in classical times more particularly to little buildings whose function was symbolic—ceremonial. It was applied to a shrine placed at the far end, from the entrance, of a temple to receive the statue of a deity—a sort of architectural canopy in the form of a

The classical form of aedicule, illustrated in a first-century painting at Pompeii.

* For a Freudian interpretation of this form of play see *Social Development in Young Children* by Susan Isaacs, 1933, pp. 362-365. Dr. Isaacs describes "cosy places" but stresses their "defensive" character rather than their formality.

† The relation of play to art is too large a subject to be entered here. Jung, in *Psychological Types* (tr. H. G. Baynes), p. 82, emphasises that its importance does not end with its interpretation as symbolism. "All creative work is the offspring of the imagination and has its source in what one is pleased to term infantile phantasy." See also Herbert Read, *Education through Art*, pp. 109-110, and the authors there quoted.



Restoration of the Temple of Bacchus at Baalbek, showing the adyton or shrine as a compound aedicule with subsidiary aedicules inset.

rudimentary temple, complete with gable—or, to use the classical word, pediment. It was also used for the shrines—again, miniature temples—in which the Lares or titular deities of a house or street were preserved.*

I am not going to trace back the history of the aedicule, but I suspect it is practically as old as architecture itself, and as widespread. This miniature temple used for a ceremonial, symbolic purpose may even enshrine one of man's first purely architectural discoveries, a discovery re-enacted by every child who establishes his momentary dominion under the table.

Now, the aedicule, from a remote period, has been used as a subjunctive means of architectural expression. That is to say, it has been used to harmonise architecture of strictly human scale with architecture of a diminutive scale, so that a building may at the same time serve the purposes of men and of a race of imaginary beings smaller than men. It has also been used to preserve the human scale in a building deliberately enlarged to express the superhuman character of a god. Perhaps this should be put another way: the aedicule has been enlarged to human scale and then beyond, to a heroic scale, losing its attribute of smallness and "cosiness" but retaining and affirming its attribute of ceremoniousness. This concept will become clearer as we proceed.

The aedicule becomes of considerable importance in Hellenistic and Roman architecture. Its use as a shrine, recorded on coins and other objects, was not its only use. The shrine *idea* was woven into the development of architecture—both temple architecture and domestic architecture. A striking instance of this is the interior of the Temple of Bacchus at Baalbek† where we see not only the shrine or *adyton*—in this case a quite substantial "temple within a temple"—but a liberal use of aedicules to provide settings for statues both in the shrine itself and in the main structure of the temple. This example, dating from the second century A.D., is obviously very over-ripe and complex, reflecting a late stage in a long tradition. But it does show, better than any other surviving temple interior, how the aedicule became interwoven with temple architecture, so that the full-scale order is laced or counterpointed with diminutive architecture of purely ceremonial significance.

So long as the aedicule is used as a setting for statues its use approximates to its original function as a shrine—a function which it preserved, as we shall see, right through the middle ages. But at some period—I cannot say when—its use was extended to give ceremonial importance to an opening—a door or a window. It then became virtually two-dimensional, a frame or portal, suggesting that the opening which it embraced was one of special significance. This special significance, however, was in due course afforded to so many doors and windows that the aedicule became nothing more than a trite, easily overworked, decorative feature. As such it re-emerges early in the Italian renaissance and as such it has been employed hundreds and thousands of times in this and every other country since the end of the sixteenth century. The Georgian door-case is an instance familiar to everybody, so familiar that it never occurs to us to consider such a thing as being anything so pompous as an aedicule or to connect it with that remote period of architectural history when the miniature temple really possessed some emotional significance, still less to that remoter period when its use was reserved for the shrine of a deity.

But the history of the aedicule in classical architecture is not a subject I want to pursue any further at present. So let us return to the more general consideration of aedicular architecture—the "little house" with which we began. For obvious reasons the construction of miniature architecture is rather uncommon; in fact, it is practically limited to the nursery, except in so far as it has become a part of the ornamental systems of various styles of architecture. However, the *representation* of miniature architecture is quite another thing; and one of the most interesting recurrent themes in the history of art is this practice of representing in paintings and illuminations an architecture of the fancy—an architecture, very often, which could not be built. Roman mural painting often consists largely of this sort of confectionery. That it is older than Rome is obvious, but the remains of Roman cities yield the richest evidence. The wall-paintings of Pompeii‡, in particular, have rendered this kind of art famous and given it the name by which it is popularly known—"Pompeian." Pompeii is rich in well-preserved mural paintings ranging in date from the first century B.C. up to the destruction of the city in A.D. 79. They have been classified in four styles, and in each successive style, aedicular architecture takes a more prominent place till in the fourth (latest) style it absorbs the whole interest of the composition. The main characteristics of this fanciful architecture are that it is completely open and incredibly thin—a mere scaffold-architecture, so reduced in mass that it appears to hang in the air. It consists of irrational and purposeless buildings—colonnades, pergolas and paper-thin walls which enclose nothing. Where there are figures they are sometimes grouped in a theatric tableau borrowed from classical drama but more often they are single figures—each posed in an aedicule and reminding one a little of the innocent ceremony of the child under the table—that symbol of architecture to which I referred at the beginning of this paper.

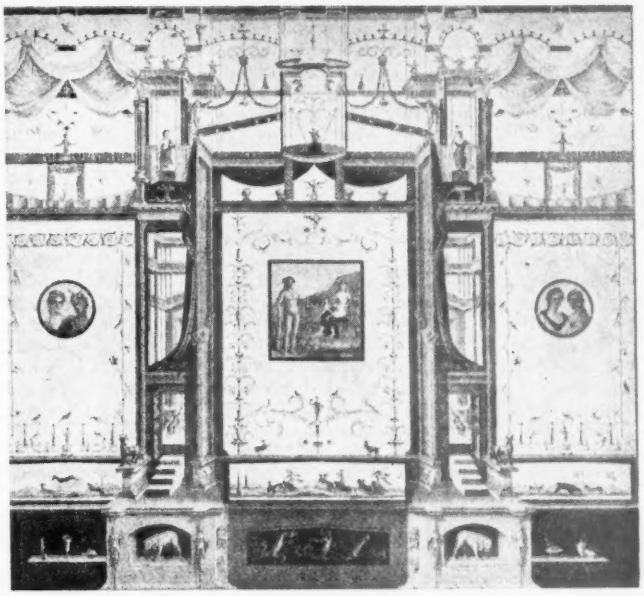
Now, at this point I am going to introduce, quite abruptly, the thesis I wish to submit—simply by asking you to compare two architectural compositions. One is a first-century wall-painting at Pompeii. The other is the south porch of Chartres Cathedral, built about 1250 A.D. You will notice that these two compositions, separated in time by more than a thousand years, have a very great deal in common. Both are divided into three bays. In both cases the divisions between the bays are open and extend upwards into aedicules, containing figures. In both, the main openings are crested with gables or pediments. In both, the supporting members are fantastically thin. In short, the porch at Chartres is, in principle, a loyal realisation of the Pompeian project!

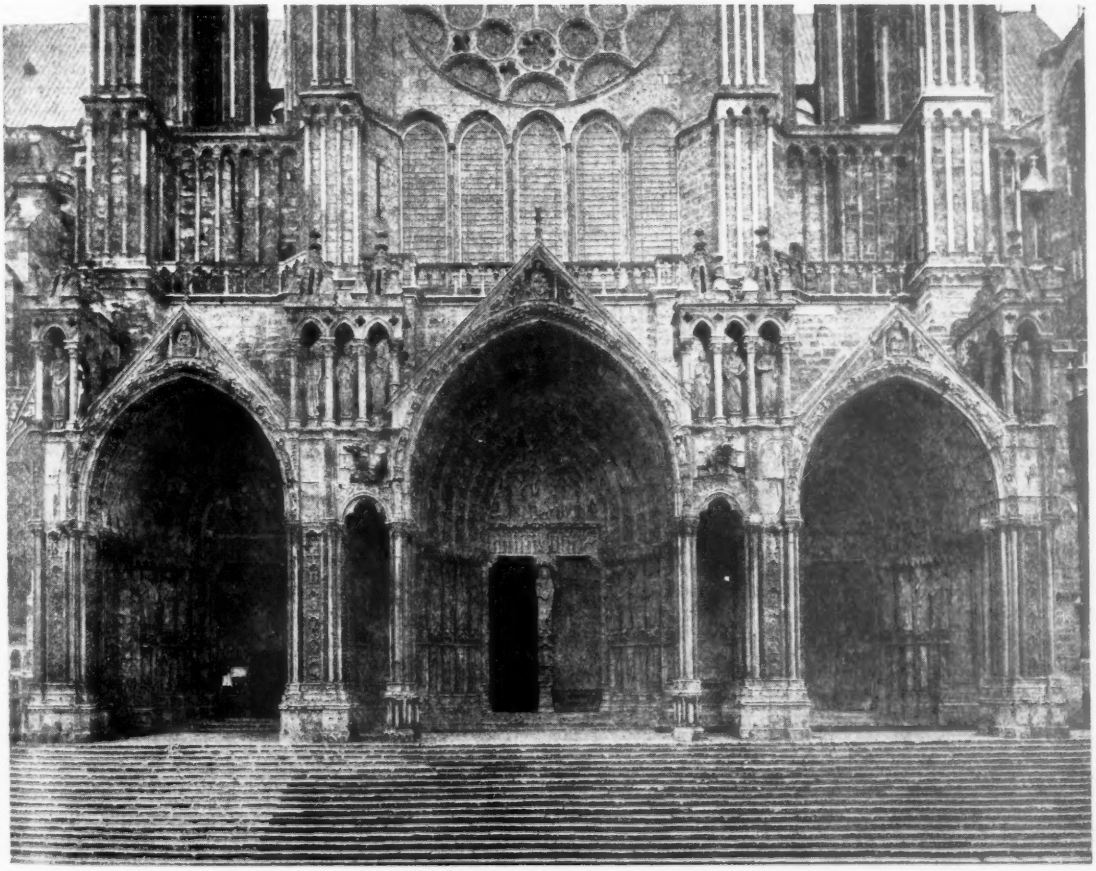
* Archl. Pubn. Soc., *Dictionary of Architecture*, s.v. Aedicula. It is curious how little currency the word has gained, either in its Latin or anglicised form. Viollet-le-Duc sometimes uses *edicule*, but there is no entry under the word in his dictionary.

† Krencker, von Lübke and Winnefeld, *Baalbek; ergebnisse der Ausgrabungen etc.*, Berlin and Leipzig, 1933, from whichthe restoration given here is reproduced.

‡ L. Curtius, *Die Wandmalerei Pompeiis*, Leipzig, 1929, illustrates the example given here, which comes originally, however, from d'Amelio, *Dipinti Murali*. For further illustrations, from Pompeii and elsewhere, see F. Wirth, *Römische Wandmalerei*, 1934.

The south porch of Chartres cathedral, compared with a mural painting from Pompeii. Note the "aedicular" character of both designs, each of which consists of pedestal, elongated main order and shrine-like superstructure.





I admit that to fortify my case I have chosen these examples carefully. The north and south porches at Chartres are, of all the architectural works of the middle ages, the most classical in proportion, distribution and detail—appropriately so, since Chartres was, in the thirteenth century, pre-eminently the seat of classical studies. I admit, too, that the Pompeian example is chosen because, in its main lines, it is a peculiarly felicitous counterpart of the Chartres porch. But, even so, the comparison is sufficiently striking to set one searching for threads with which to link these two works of art together. Can there possibly be any *historical* threads? Or must we refer the resemblances to a basic psychology shared alike by the artists of Classical Pompeii, those of Medieval Chartres and the child under the table. I believe that there are historical threads; but I do not think that they could have spun their way through a thousand years of history but for the primitive and universal love of that kind of fantasy represented by the aedicule—the "little house."

When the Chartres porches were built, Pompeii lay forgotten in its tomb of ashes—even the name of the place had disappeared from human conscience. Obviously no influences from Pompeii itself can ever have found their way into the medieval world. But the art of Pompeii was an art widespread in the Roman empire and it is only a freak of history which has made the buried city its most conspicuous exemplar. The character and themes of Roman decoration were adopted by Christian artists in many parts of Europe. In the Byzantine Empire, aedicular structures are found in many mosaics—those of Salonika for instance, and of Damascus. In the Carolingian renaissance of the ninth century the aedicule appears in various objects—in altar-fronts of metal, like the famous Basle altar in the Musée de Cluny, in manuscripts like the Gospel of S. Médard-de-Soissons in the Bibliothèque Nationale*; in doors, shrines and plaques, and also in what little architecture of that age is left to us. It must also have appeared in the stucco work used on the walls of churches but which has almost entirely disappeared.†

Carolingian art provides, no doubt, the most important link between the classical world and the Romanesque revival of the arts in the eleventh century. But Romanesque art is, as Deschamps‡ says, the most composite of all arts; there were innumerable contributors to its creation, nor must we forget the main stock—the "First Romanesque"—on which these contributions were grafted. The First Romanesque of Lombardy had already adventured into arcaded west fronts (like Pavia and Lucca) which are, in effect, aedicular fantasies, and the First Romanesque of France and Spain has its arcaded apses, pilaster-strips, bands and corbel-tables consisting of suspended arches. In the Romanesque churches of Languedoc and Burgundy the aedicular idea is ever-present; in Provence it links up directly with the Roman use of the aedicule; in Poitou and the west generally it begins to be articulate in a most picturesque way; in Normandy and England it is all ready for the next move—the creation of Gothic.

It has been satisfactorily shown, by Mâle§, Lasteyrie‖ and others, that the re-entry of figure-sculpture into architecture in the Romanesque churches of the eleventh century was conditioned by the sculptors' familiarity with metal-work, manuscripts and other objects of art: the technique of architectural sculpture, up to the Gothic revolution in the middle of the twelfth century shows clear evidence of such a derivation. But so far as I know, nobody has developed the corollary of this—namely, that the aedicular architecture of Romanesque churches may have been reinforced or given renewed vitality from the same source.

Romanesque architecture is, as I have said, composite; it is an aggregate rather than a synthesis. It preserves much that is Roman—the round arch, the barrel vault and, in some parts of France the principle of the pilaster and Corinthianesque carving. But to this is added something—something which distinguishes this architecture as Romanesque. This is not simply a matter of ornament—of characteristic sculptures and mouldings. Nor is it a matter of structure, the empirical quest of a satisfactory vaulting system—this quest is, in fact, curiously independent of stylistic development. It is more radical than all this; it is something resulting from a profound desire to escape from the remorseless discipline of gravity, a desire to dissolve the heavy prose of building into religious poetry; a desire to transform the heavy man-made temple into a multiple, imponderable pile of heavenly mansions.

What is behind this compelling ambition I do not know; to answer that question one would have to approach the subject from a different angle, exploring the psychological atmosphere of Romanesque church-building as it arose from changing social conditions. But two things are sufficiently obvious. First, that the ambition to dissolve architecture from the substantial to the insubstantial did exist; and second, that this ambition was aided and inspired by a feeling for that fantastic, evanescent aedicular architecture which, through the various channels I have mentioned, had been handed down from the theatre, house and tomb decorators of Rome.

I have said that Romanesque represents an incomplete synthesis. By this I mean that the aedicular architecture is never wholly identified with the structural carcase. It was introduced in various ways, easily enumerated. First there is the ornamental shaft, tall and thin, like a literal enlargement of the fancy-work of Pompeii. Sometimes it is applied to the wall, sometimes it is sculptured in the wall itself. Sometimes it pretends to support one end of an arch; sometimes to support a corbel-table, sometimes a vaulting rib, sometimes a wooden roof; sometimes it does not pretend, and supports nothing. Second, there is the arcade, a decorative repetitive combination of shaft and arch—a motif so often allied with the representation of figures that Focillon* has adopted *l'homme-arcade* as an expression; and, most important, there is the vaulting, of which I shall have more to say in a moment. All these features emerge in the Romanesque architecture of France and England, but they do not really lift the architecture off the ground. They have the gaucherie of some would-be aviator who by fixing wings to his shoulders and looking up to heaven hopes he may find himself flying. In Romanesque, it is always the grave, sombre rhythm which appeals to us; the aedicular scaffolding grafted on to it is rarely moving and often tiresome and bizarre.

Romanesque is puzzling, ambiguous, incomplete. The point of all its busy-ness eludes one. Then, suddenly, the creation of Gothic explains everything. Some extraordinary men—some among Abbot Suger's masons at Saint Denis, some elsewhere—saw precisely how to arrive at a true synthesis of the warring elements in Romanesque. They were followed by others and within a hundred years the whole of the first and decisive chapter of Gothic had been written.

The nature of Gothic architecture has been expressed in many formulas, but almost all, since Viollet-le-Duc, are based on technical rather than æsthetic premises. These premises may be perfectly correct but to give them primacy in an exposition of Gothic architecture is to perpetuate the nineteenth century fallacy that architecture is a matter of structure *plus* adornment. Viollet-le-Duc, by analysing French Gothic in terms of equilibrium made it seem that this was so; but you have only to examine Viollet's own personal background† to see why it was necessary for him, in his time, to see Gothic in this way. His method was to break down the Gothic problem from outside, to expose it in the terms which his age and his temperament dictated. His method has dominated the exposition of Gothic ever since; but I venture to suggest that for us, in our time, the

* R. Hinks, *Carolingian Art*, 1935, pp. 155-6, discusses themes common to Pompeian and Carolingian Art.

† Sir A. Clapham, *Romanesque Architecture in Western Europe*, pp. 14 and 23.

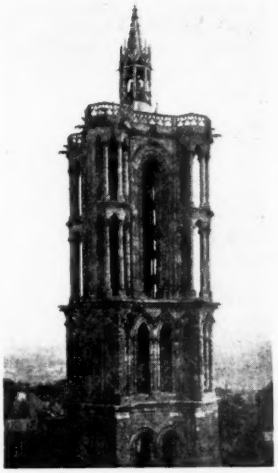
‡ P. Deschamps, *Romanesque Sculpture in France*.

§ E. Mâle, *L'Art Religieux du 12e siècle etc.*, 2nd ed., 1924.

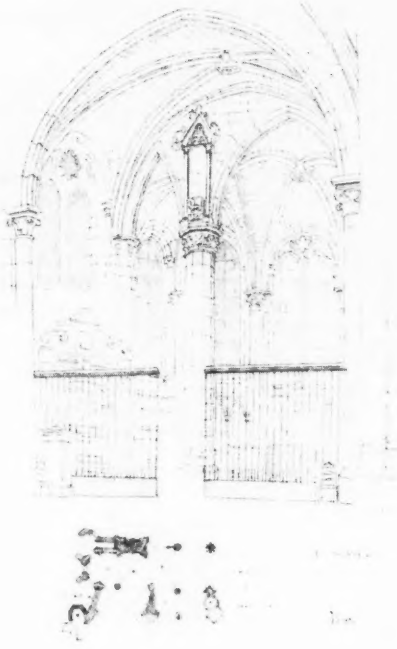
‖ R. de Lasteyrie, *L'Architecture Religieuse en France a l'Époque Romane*, 1929, pp. 196-201.

* H. Focillon, *Art d'Occident*, 1938.

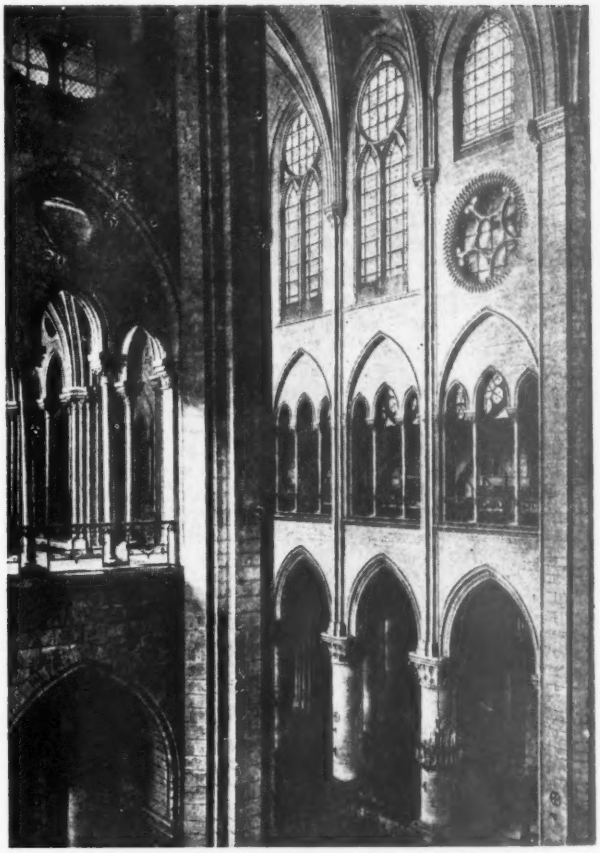
† P. Gout, *Viollet-le-Duc; sa vie, son oeuvre, sa doctrine* in Revue de l'Art Chrétien, Supp. III, 1914.



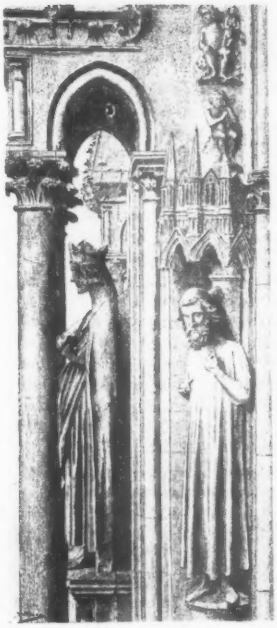
One of the four towers of Laon Cathedral, consisting of superimposed "aedicular" orders. Note the vestigial survival of the gable-motif in the form of hood moulds.



North-west chapel of the choir of Le Mans Cathedral: an improvisation at the juncture of old and new work, showing the freedom and flexibility of "aedicular" design.



Nave of Notre Dame, Paris, from the south transept, showing the principal "aedicular" order rising from the capitals of the lower arcade.



Detail from Rheims Cathedral, showing aedicules of varying size and scale.

rationalistic, non-psychological method is inadequate. And, further, I suggest that the point where the Gothic reality is most easily grasped is precisely in this concept of aedicular architecture, this re-captured inheritance of what let us boldly call "Pompeian" art.*

The creation of something new in the arts invariably means the turning-upside-down of some uneasy equilibrium, the making of an adjunct into an essential, a parasitic growth into a main stem. So it was in the passage from Romanesque to Gothic. In Romanesque, the aedicular episodes are ornamental, *merely* ornamental—parasitic. But the creators of Gothic seized upon this incidental "Pompeian" idea and made it capital. In doing so they created, and at the same time solved, certain structural problems as well as other undefined problems of space and proportion. If we study Gothic in this light—as the evolution of an idea—we shall find that both the technical and the æsthetic aspects fall into place and become readily understandable from our twentieth century standpoint.

As everyone knows, one of the most striking innovations in Gothic is the universal adoption of the pointed arch in place of the round arch. The reasons for its adoption have often been summarised in terms of statical expediency, but there is plenty of evidence to show that it was a matter of deliberate choice—a matter of taste. The pointed arch, with the cusp and one or two other things†, were stolen from Arab art across the Pyrenees. It was used here and there, in a casual way, in Romanesque work, for the novelty of the thing, and then seized upon as an essential by the creators of Gothic. It was seized upon as essential, *not* because it was materially essential, but because the pointed arch struck that note of fantasy which was what the mind of the age desired. It wilfully destroyed the discipline of the round arch, which had become an incubus and a bore and stood in the way of the realisation of the free "Pompeian" church of the future.

The pointed arch was, of course, structurally convenient; but this matter of convenience has been over-stressed. I repeat that Gothic *created and simultaneously solved* its problems. The notion of the Gothic system solving the Romanesque problem is from the point of view of structure, unreal. We are told that the pointed arch rendered possible the high, brittle structures of the thirteenth century. But this is not strictly true; structures just as high and just as brittle could have been constructed on a round-arched system. Certainly, the pointed vault exerts a smaller outward thrust against the walls; but in such a very slight degree that one cannot conscientiously see any compulsion in this circumstance. It is convenient, as the builders of Durham early discovered, to use pointed transverse arches in a vault, thereby facilitating the use of semi-circular diagonals while retaining a level ridge. But here again it is no more than convenience; and it cannot be seriously maintained that in these great ceremonial buildings the ancient, superb, discipline of the round arch was disrupted merely for the sake of a limited degree of technical convenience.

No. The pointed-arch system was, I believe, adopted for this reason: it had an air of fantasy—perhaps, dare one guess, of oriental fantasy‡—which went along with the realisation of the "Pompeian" idea. It is impossible, of course, to reconstruct the associations which focus round a given form at a given time; but for some reason the pointed arch became attractive in itself at the same time that the aedicular idea had been fully deployed as the subjunctive architecture of the Romanesque. So the whole architectural situation was turned upside-down. Instead of the aedicule serving to adorn the structure, the structure was made the slave of the aedicule. And as a supreme gesture of enslavement, the round arch was broken.

An examination of the great cathedrals of the 12th-13th century shows how the aedicule took charge of the new situation. This theme of pure fantasy, once released from bondage, was free to range through all gradations of stature* from the heroic to the minuscule. In the naves of the great cathedrals, for instance, we find it performing with easy success the function which the Romanesque had already visualised and painfully attempted in the churches of Caen. At Laon, an aedicular cathedral, composed of shafts and ribs, springs from the capitals of the sturdy nave columns, which form, as it were, a link with the past, the old prose basis from which the Gothic fantasy takes wing. When we come to Amiens we find that the shafts spring from the floor; the sense of a Romanesque basis has vanished and the whole conception, from floor to vault, is aedicular. Aedicular in this sense: that the miniature sky-architecture of the Pompeian paintings has been *realised*—re-enlarged, as it were, to the scale from which the painters may be supposed to have reduced it.

In this aedicular architecture of the grand order, it is to be observed that the ribbed vault plays a most conspicuous and dramatic part. It is the rib, rather than the vault as a whole, that captures the eye, the rib which flies away from the shaft above its diminutive capital and joins its fellows in a boss at the very summit of the building. Now this rib is often supposed to be an essential part of the structural scheme of Gothic architecture. It is supposed, in some mysterious way, to canalise the forces latent in the vault and carry them safely down into the buttressed pier. But this is a *post facto* rationalisation. The common-sense truth is that the safety of the vault does not depend on the rib, but on the coherence of the vault as a whole, just as it does in any groined vault of the seventeenth century. The researches of Victor Sabouret† and Pol Abraham‡ have established this beyond dispute. If a vaulting rib is smashed by a projectile, the adjacent part of the vault does not collapse; and if the abutments of a vault are weak it is not necessarily the ribs which start to crack. The rib is simply an ornamental reinforcement of the angles of the vault; the fact that it projects from the vault is of no structural importance whatever. No: the vaulting rib, like almost everything else in Gothic architecture, originates in an æsthetic intention. The ribbed vault, in fact, may be compared with the airy pergolas which make their frequent appearance in the fantasy-architecture of Pompeii.

From the master-order constituted by the nave shafts and vaulting-ribs, the aedicular scheme descends in a gradation of inferior orders. Thus, a secondary order is provided by the shafts of the nave arcade, which control the stature of the entire chevet and its chapels, each one of which becomes a paraphrase of the apse itself. The triforium has its own order, so has the clerestory; the towers rise in stages, order above order. Each portal has its own complex of orders, ranging from the grand aedicules which provide the gables for the arches, to the lesser terraced aedicules which canopy the prophets and martyrs ranged along the jambs. The whole cathedral resolves itself into these aedicular orders, sometimes pertaining to and articulating the structure itself (as in the ribbed vault), sometimes confusing and even contradicting the structure. And from first to last all effort strains at one objective—the destruction of mass, the creation not so much of upward flight, as of suspension in space, the creation of an architecture wholly independent of the exigencies of gravity.

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Having proposed the aedicule as the psychological key to Gothic, it remains to test the proposition in relation to some of

* William Burges was probably the first to draw a parallel between Pompeian painting and Gothic architecture. He used to say that early French Gothic had more in common with Greek and Pompeian than with the later phases of medieval architecture.

† Emile Mâle, *Les Influences Arabes dans L'Art Roman* in *Revue des Deux Mondes*, Nov. 15, 1923.

‡ Mâle, in the article already quoted, speaks of "cet éternal Orient qui a fasciné le moyen-âge" in relation to some features in churches associated with the pilgrim routes to Compostella.

* I deliberately use "stature" and not "scale," because one of the fundamentals of Gothic is the preservation of a single scale throughout the structure, in contrast to the classical method by which a combination of two orders represents a combination of two scales.

† *Les voûtes nervurées, rôle simplement décoratif des nervures*, in *Le Génie Civil*, March 3, 1928, quoted by Pol Abraham in *Nouvelle Explication de l'Architecture Religieuse Gothique* in *Gazette des Beaux-Arts*, 1934, p. 257.

‡ *Op. cit.* Abraham has devoted a whole volume to the criticism of Viollet-le-Duc's theories: *Viollet-le-Duc et le Rationalisme Médiéval*, 1934.

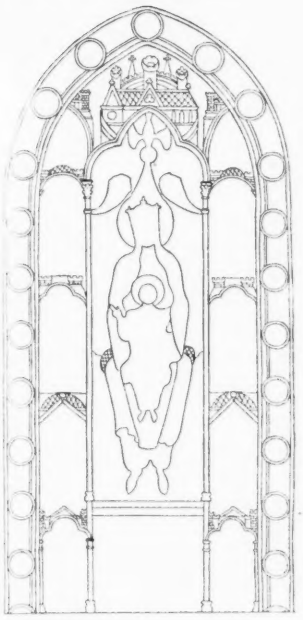
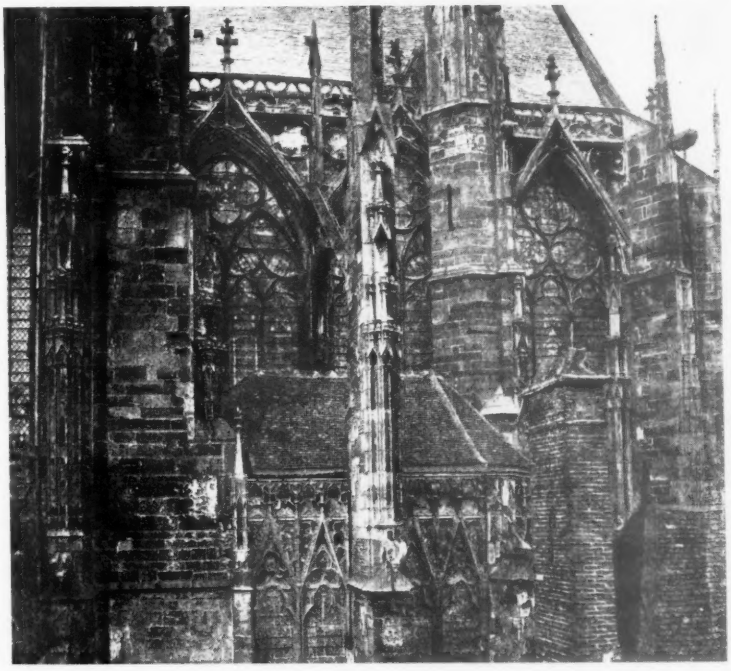


Diagram of the "aedicular" architecture contained in the Belle Verrière at Chartres (c. 1150), prophetic of the stone tracery of the next century.



The choir of S. Urbain, Troyes, a thirteenth-century church in which "aedicular" design reaches its fullest expression.

those characteristics which are no less essential to a complete view of the Gothic phenomenon. Of structure, I have already said something, but perhaps I should recapitulate. I believe that it was the "Pompeian" idea which *sanctioned* the Gothic system. It sanctioned the rupture of the round-arch and arrogated the resulting flexibility of plan to its own purposes. Nowhere is the "Pompeian" character of Gothic more expressive and lovely than in those instances of apparently improvised vaulting necessitated by the junction of old work with new or by adaptation to an awkward site. Here the scissor-like flexibility of the pointed arch performs all sorts of antics—antics which would be perfectly ridiculous if we did not take them in the spirit in which they are meant—the spirit of a "Pompeian" perspective.

Precisely the same æsthetic sanction converted the flying-buttress from a pathetic makeshift, an admission of defeat, to a romantic and beautiful component of the system, a fairy viaduct having a ridiculous affinity with the conceits in some of the stucco panels in the Naples Museum.

Again, Gothic mouldings develop under the sanction of the aedicule. They represent a device by which the onset of gravity, of inert mass, is dissipated at those places—chiefly openings—where it would normally be most felt. The wall surrounding an opening is disintegrated into a cluster of thin members whose articulation is stressed by the deep undercutting between them; each of these members represents or betokens an aedicular unit which, in early work, is fully expressed in terms of base, shaft, capital and archivolt. The mouldings of capitals are profiled so as to defeat the impression that they are carrying weight; the upper moulding, salient and deeply undercut, gives a shadow suggesting suspension rather than support. Unrelated to the aedicular idea, Gothic mouldings can become meaningless; they do so where the idea is obscured by an excess of vanity on the part of the mason—as, for example, in the Angel Choir at Lincoln—where the mouldings nearly defeat their own end.

The evolution of tracery is, I suspect, closely related to the use of aedicular designs in early stained glass. For instance, in the Belle Verrière of Chartres, dating from the middle of the twelfth century, the aedicule within which the Virgin is seated and the lateral aedicules containing censing angels, unite to form a structure wonderfully prophetic of the tracery of the next century.

And so one could go on. The aedicule unlocks door after door.

* * * * * *

The aedicular system stands complete, perfectly realised, in the first quarter of the thirteenth century. From the middle of the century onwards it is underlined, stressed and even exaggerated, notably by the liberal use of ornamental gables, sometimes in a rather mechanical, inharmonious way, as who should say, "don't forget that this arch is not just an arch but also a shrine." This kind of mannerism reaches its peak in a church like Saint-Urbain at Troyes—perhaps one of the most technically perfect of all French churches—where all the windows are gabled, the apex of each gable thrusting through the pierced parapet of the church.

It is during the first half of the thirteenth century that one of the major implications of the aedicular system is gradually unfolded. The aedicule is, in essence, a shrine. The Gothic cathedral is, therefore, a multiplication of shrines. As we have seen, these shrines—aedicules—are disposed in a series of orders, descending from the master-order which controls the bay-unit and the vault. The stature of the orders is diminished in the aisles, again in the clerestory and triforium and once again on the purely ornamental plane, It is here that it joins hands with the sculptor; these last aedicules are inhabited not by the human users of the cathedral but by supernatural beings carved in stone. Here, in fact, the aedicule returns to its proper scale and proper function—here it is once more the "little house." Indeed, it is perhaps more logical to regard the whole Cathedral as an *ascent* from this scale—the normal aedicular scale—than to regard the ornamental aedicule as a reduction from its grand relations who have grown big and been married to the structural carcase of the building.

Anyway, it is on the ornamental plane that the aedicule is employed for the identical purpose for which it is used in manuscripts, ivories, enamels and reliefs, namely, to provide a frame-

work, a *mise-en-scène*, for iconographical exposition. Already in Romanesque buildings, this idea has been exploited, especially in west fronts (*e.g.*, Angoulême) and portals. But in Romanesque work the sculpture is stylised and the aedicule is a dead form—or rather a chrysalis-form whose potentialities are hidden. The Gothic artists brought to life not only the sculpture but likewise the aedicule itself. Hence, the porches of Chartres, one of which we have already examined ; hence also the great portals of Amiens, Bourges, Rheims and Laon.

The porches of Chartres are wholly exceptional in their perfect fusion of classical and Gothic form. The great portals of the other cathedrals are differently conceived. As they are not self-standing but grow from the main structure of the cathedral, they have to struggle for their aedicular independence. Thus, at Amiens, the conflict between the descent of the massive western buttresses and the upthrust of the aedicular architecture of the porches is grotesquely painful unless one acquiesces in the artists' pressing invitation to forget all about gravity and mass and accept the aedicular scheme and that alone—a scheme without gravity, suspended in the air. To help you to this illusion they have done everything in their power. They have made the aedicular frontispiece fantastically top-heavy, with huge pinnacle-formations at the summit and no base-mould whatever except a trivial offset near the ground, as if to declare with maximum emphasis that such architecture as this does not rest on the ground, does not need foundations (the Reims artists, who carved hanging draperies round the base of the portal pressed this point even further !). To defeat the potential onset of gravity in the buttresses they have sunk roses and quatrefoils in them, as though casually to suggest that the masonry surface is a mere veil. And to emphasise once again the *suspended* character of the composition they have contrived deliberate discords where the gable-eaves meet the buttresses, suggesting that the gables which might seem too substantial if they seemed to rest on the frail structure beneath are themselves suspended from the clouds and have just been drawn into place by the flying monsters straining from their lower angles. Has any Baroque or Rococo architecture ever set out to contradict the structural elements of a façade with such determined insolence ?

It is in these great porches and portals, as I have said, that the aedicular scheme is harnessed to the purpose of the iconographers and sculptors. Just as the architecture of the Pompeian murals provides the setting for scenes and personages drawn from classical myth and drama, so these portals provide the setting for those iconographic arrangements which, as Emile Mâle showed in his great books, are no arbitrary or sentimental groups but schematic expositions drawn from the theological and encyclopædic literature of the middles ages.

It is in these portals that the aedicule is most like itself—most "Pompeian" and most childish. But I contend that they are only part of a greater whole, the cathedral, in which the same idea is constantly, and with some degree of consistency, pursued. And I contend that for us, in the twentieth century, this notion of the aedicule as the leading theme in Gothic offers itself as the most sympathetic and workable key to the interpretation of those amazing buildings.

DISCUSSION

SIR ALFRED CLAPHAM : Mr. Summerson has put before us a most intriguing theory, and has done so in a way which will convince a great many of us. It is delightful to consider that architecture "lies about us in our infancy," and I think that it is essentially true. I do not think that it leaves us with our infancy, because Mr. Summerson has shown how in later years we tend to go on to produce—or at least we did in the past and no doubt shall do so in the future—these aedicules. I hope that we shall in the future produce them as successfully as was done in the eighteenth, seventeenth and earlier centuries. I should like to call to your minds in this connection that delightful little building outside Dublin called the Casino, a lovely little gem. I would recall to you also the mausoleum at Castle Howard. That very young, though physically aged man Horace Walpole, on his first sight of the mausoleum at Castle Howard, records in one of his letters, after describing the house, that he also saw the mausoleum, "which would tempt one to be buried alive."

Mr. Summerson has not, as possibly some of us expected, treated this matter from a romantic point of view. That, no doubt, passed with our fathers—the talk of "great cliffs of lonely stone arising," and so on. Some of us may feel that he has gone a little far in subtracting from the structural basis of Gothic. I think that there is some significance in the way in which the great French architects of the North of France pursued the erection of these vast Gothic buildings. Their aim eventually was height. In the end they came to grief at Beauvais, but I do not think that the attempt at Beauvais could have been made without the pointed arch, the ribbed vault and the elaborate system of flying buttresses which support it.

With regard to aedicules in general, let me recall to you two which are always in my mind. One is a charming little structure tacked on meaninglessly to the south transept of the parish church of Bishop's Cleeve in Worcestershire. It serves no purpose whatever, but is a charming piece of thirteenth century fantasy which is germane to our subject this evening. The other is on an altogether vaster scale and is the west front at Peterborough, which is one of the vastest of the portal aedicules with which Mr. Summerson has been dealing. I have the greatest pleasure in proposing a vote of thanks to Mr. Summerson, to whom it has been such a pleasure to listen.

PROFESSOR GEOFFREY WEBB, M.A. [*Hon. A.*] : One thing which makes me particularly grateful to Mr. Summerson and very glad to be able to second this vote of thanks is that although we were all brought up on this structural gospel about Gothic which descends from the nineteenth century—and I still think, in spite of what Mr. Summerson says, that it is very necessary to start from that—it is necessary also to go on somewhere, and the trouble has been that very few people have attempted to say where we should go from there. The Viollet-le-Duc system is so very satisfactory : you begin at the beginning and go on to the solution, the final development in the thirteenth century, and there you are. The trouble with that system seemed to me, when I first began to have doubts about it, to be that it did not fit the architecture of any country except France, and notoriously other countries enjoyed Gothic, including this one. I am not sure that the new aedicular gospel has solved all the problems, but it is a new approach, and the fact that it is an æsthetic approach rather than a constructional approach is a very comforting and healthy sign.

It is most ungracious of me to quarrel with Mr. Summerson, who has set our feet on a new path, but as his paper went on it seemed to me that the word "aedicular" was becoming almost equated with "fantastic." I agree with him and disagree with Sir Alfred Clapham in thinking that it is not only structural considerations which caused the change from Romanesque to Gothic ; it was a matter of taste. Mr. Summerson has made out a strong case for the change being in the direction of architectural fantasy.

He also made out a case for there being, in the composition of architectural fantasy, a strong strain of the miniature house. I was expecting to see pictures of the real minuscule aedicules on some of the buildings which he showed us. Over the top of the figures on the west portal of Chartres there are complete little heavenly towns with gables, spires and roofs, little towns which surely come from a similar decoration from the tops of arches in manuscripts of the twelfth and earlier centuries, and which are found even on tomb slabs. There is a very good early tomb slab in Ely, where the angel catches the soul of the deceased in a napkin up to heaven ; and he stands framed in an arch on the top of which is a complete little heavenly city. It seems to me that there you have the real aedicule, because you have a violent change of scale, a sudden change from the major building to the baby building which adorns it. It sometimes seems that when the two scales get nearer together you begin to lose the scale of the aedicule altogether, and that way of obtaining architectural fantasy begins to disappear.

That is why I feel that it cannot be said that the aedicule will explain all architectural fantasy, or even quite as much as Mr. Summerson has tried to persuade us to-night ; but, in spite of that ungracious suggestion, I should like to record my feeling of gratitude and enlargement of the spirit for having been suddenly freed from the bondage of Viollet-le-Duc. That is not for the first time, but, as a German philosopher has said, "Oh for one man who can support me in my belief !" I have found a man who says "You are quite right to escape from Viollet-le-Duc," and it gives me great pleasure to second this vote of thanks to him.

MR. MARTIN A. BUCKMASTER [*Hon. A.*] : It has been most refreshing to see a few Gothic slides on the screen. It is not usual ; we usually get the modern building, which to me has no very great attraction. I have been rather puzzled, however, about one thing ; I could not see that there was very much connection between the Pompeian

paintings and the subsequent architecture which Mr. Summerson showed us of Chartres, a thousand years later. Apart from the fact that a statue was put into a niche I could see no similarity whatever, and I should have thought it was obvious that with the lapse of a thousand years there could be no similarity or parallelism at all between the Pompeian paintings and the magnificent French Gothic architecture.

It is also notable that he is wedded to Early Gothic. That is very natural from a structural point of view, but there is a beauty about Gothic, and especially French Gothic, when it goes absolutely wild, as in the architecture of Rouen and various other places where it becomes almost rampant, and certainly French Baroque is supremely beautiful, at least to my mind.

DR. R. WITTKOWER (Warburg Institute) : I was very interested in the idea put forward by Mr. Summerson. I myself have made some studies in the same direction, though not exactly over the same period. I found similar interesting views of the aedicule in the seventeenth and eighteenth centuries, and I suppose that the theory put forward by Mr. Summerson could be carried on into later periods through the Renaissance and particularly into the seventeenth century where the aedicule was used very much, particularly in facades. There is a whole type of later seventeenth century facade which is built according to the aedicular scheme. I am thinking particularly of the group of facades which begins in Rome with Sta. Maria in Campitelli, and similar facades in the south of Italy, and also some in the north. I am sure that this idea could be followed up with very valuable results for the history of architecture and for our approach to whole groups of buildings.

MR. D. H. MCMORRAN : Most of us are busy planning very small houses in these days, and Mr. Bevan is no doubt encouraging the study of aedicular architecture ! I have just managed to steer through a scheme which has some small features which please me, and I know now that they are aedicules. I think that Mr. Summerson might have referred to the shrines of our later cathedrals and churches, which are a notable example of his point, and carried out with such details as small buttresses, tiny little canopies and so on. Reference has been made to modern architecture. The aedicule finds no place in the teachings of Frank Lloyd Wright, le Corbusier and others. Can Mr. Summerson throw some light on that ?

MR. LESLIE WOOD [*A.*] : One very small point which seems to reinforce Mr. Summerson's thesis is that when the Gothic artists were freed entirely from the necessities of structure they achieved completely fantastic aedicular forms in manuscripts, and one saw no conflict between the aedicular idea and that of the structure, as one does on the buildings. An example of manuscript architecture with which most people are familiar is provided by some of the settings for the film of Henry V, which were very charming and very much in that character.

It would be interesting if Mr. Summerson could throw light on possible aedicular developments in Saracenic architecture, in Spain in particular. He mentioned the importation of the Gothic arch across the Pyrences, and in some of the Saracenic work in Spain there is development of very much the same character as appears in Gothic. I do not know enough about it to instance any examples, but he may be able to point to some.

A point which occurred to me in looking at some of the slides he has shown was the stalactitic character of some of the suspended architecture. Is there any known instance in architecture of inspiration from natural stalactites ?

MR. JOHN PURSER : I was particularly interested in the early part of the paper, in which Mr. Summerson develops the psychological background to the idea of the aedicule. It is interesting to find that in the oldest stone monument made by man, the Temple of Zoser at Sakkala, which I saw recently, and which seems to have been the almost spontaneous development of a great genius, Imhotet, the architect, one enters through a gallery between ranges of attached fluted columns and passes through some very small halls into a court of honour composed entirely of miniature temples—that is, miniatures of things which up to then had never been built, for this is the first stone temple. It seems, therefore, that on the first occasion on which man built in stone on a great scale, aedicules were what were built. The whole thing is a fantastic complex, about the size of Versailles and on not much more than half human scale.

MR. MARTIN S. BRIGGS : If I have got the right idea from this excellent and most interesting and iconoclastic paper, it is an emphasis on the diminutive such as we get (although Mr. Summerson did not mention it) in some of the Gothic screens, where we have buttresses in miniature, though they are inside the building and made of oak. If that is the main point of his aedicular theory I should like to ask whether he has considered the reverse of it. I have always understood that the Albert Memorial is a slightly exaggerated and enlarged edition of certain miniature shrines. Would he regard that as aedicular architecture seen through the wrong end of the telescope ?

MR. G. E. BRIGHT : There seems to me to be an obvious anomaly in Mr. Summerson's paper, in spite of its excellence. Surely the Pompeian screens and paintings were derived from a structural basis ? I think I am right in recalling from what I learnt at college that the Parthenon and various other classic examples of architecture originated from structural forms. The eave, for example, was the overhanging of the original wooden beams and rafters, which were later interpreted by the Greek architects in stone. I should be very interested to hear Mr. Summerson's comments on that point. In other words, if the aedicular and Gothic structure is derived from Pompeian wall paintings and frescoes, surely those in turn were derived from an architecture which was structural in origin ?

I should like some information on Ruskin's version of Gothic, which I think he said was based on nature, or on a natural consideration of art. Although he may have been wrong in his point of view, he said that all art was necessarily based on nature. Many art critics at that time disagreed with him, and I should be interested to hear Mr. Summerson's comments on that point also.

MR. HUGH CASSON : I should like to thank Mr. Summerson very much for his stimulating paper. Despite Professor Webb's beguilements, I find it very difficult to appreciate Gothic architecture, and when in France I go to look at the Romanesque churches and not the Gothic ones. Now I know about aedicules, I shall look on the Gothic with a new eye and not worry about bending moments any more !

I should like to ask what hope Mr. Summerson holds out for the aedicule to-day. As a recent speaker has said, "Heaven in our infancy has given way to Bevan in our adulthood," and the modern aedicule is 1,000 square feet. Does Mr. Summerson think that we can incorporate the aedicular idiom into modern design, or only into Gothic architecture ? If the latter, is he firing the opening shot in what may be a new Gothic revival ?

MR. JOHN SUMMERSON (in reply) : I should like to thank Sir Alfred Clapham and Professor Webb for their very kind and sympathetic remarks. Had I known in the first instance that they were going to make speeches of that kind, I should have felt much more confidence in what I was going to say !

Mr. Buckmaster saw no similarity between the Pompeian paintings and Chartres—and I do. I think that that must remain a matter of opinion.

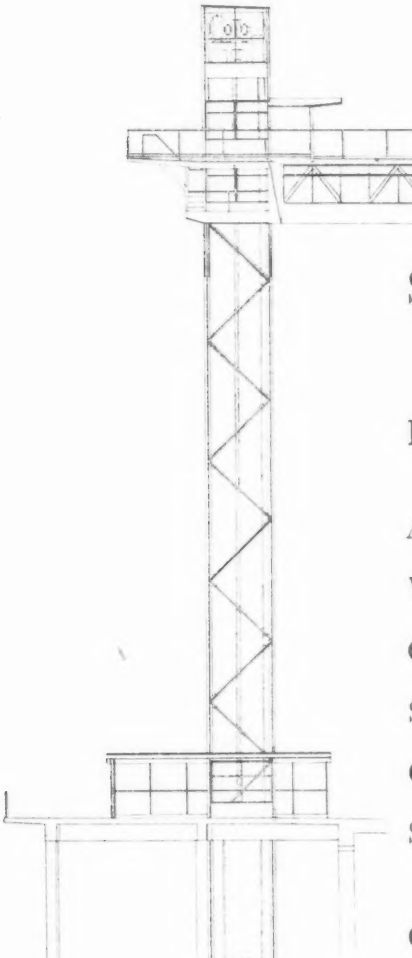
Dr. Wittkower's remarks on the continuation of the aedicule into the seventeenth century are most interesting. What I found when I wrote this paper some years ago was that once you start on aedicules you begin to see them everywhere. I left out any reference to later Gothic work because with only an hour at my disposal I thought that I ought to concentrate on what is obviously the key period of Gothic. If you can answer the Gothic problem in the twelfth and thirteenth centuries you know where you are. In the course of the long decle sion of Gothic from the thirteenth to the sixteenth centuries the aedicule developed in all sorts of ways, as Mr. Briggs said ; you find these miniature buttresses on screens, and the last slide which I showed on the screen, of Strassburg cathedral, showed the way things were going.

I think that both Sir Alfred Clapham and Professor Webb suspected me, and quite rightly, of over-emphasising the aedicular theory as though I were its publicity agent. If in a short talk you are trying to make one point clearly you have to exaggerate, and my theory of aedicules is only one tiny footnote to the study of Gothic. My sole contention is that it is possibly a footnote worth inserting.

As to the future of the aedicule, in an age of minimum flats I do not think that it has much future. Just before the war there was a movement in favour of balconies for babies which I always suspected was an overt attempt to reintroduce aedicules, but I do not think there is any likelihood of aedicules popping up on anybody's drawing-board. Anyway, they catch the dust !

The structural basis of Pompeian paintings has been referred to. I think that they are clearly derived from buildings which have been built, and it raises the question of whether we could go back to the original aedicules which were independent of erected buildings at all. One speaker suggested in a very interesting way that it was possible to go back for a very long time and find these things, but I think it is part of the nature of the aedicule and of its use as a symbol that the idea of a dwelling, a house, already existed, and was epitomised in this symbol, the aedicule. The direct origin of these Pompeian paintings is, I think, the stage. There is very little doubt, I think, that the Pompeian painters were really bringing the stage into people's houses, and one can well imagine that these spindly, scaffold-like compositions originated with the stage.

One question which I cannot answer is that about architecture and nature. It is too big altogether !



SWEDISH ARCHITECTURE IN 1946

PART II.

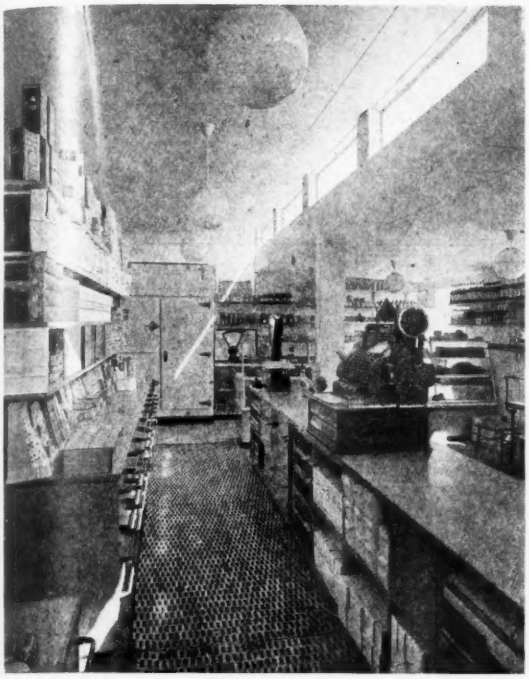
ARCHITECTURAL WORK OF THE SWEDISH CO-OPERATIVE SOCIETY

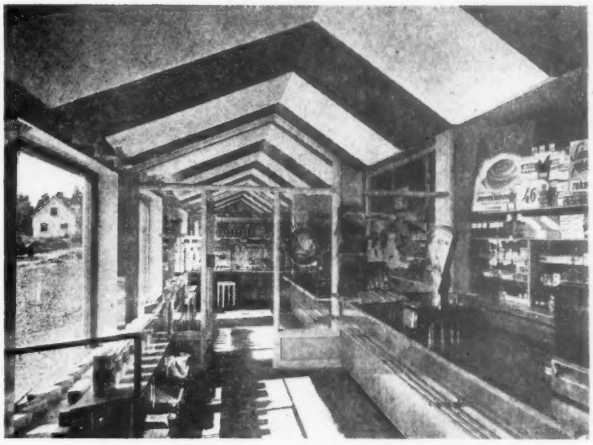
Chief Architect:
Professor Arkt. S.A.R.,
Eskil Sundahl

Headquarter building of the Swedish Co-operative Society in Stockholm with the famous suspended Gondolen restaurant

The co-operative movement occupies a more prominent place in Swedish national life than does its British equivalent in this country. As regards scale of operations, more than one-third of the population obtains its supplies from the K.F. (Kooperativa Förbundet). The K.F. builds its own factories and housing, designs and makes furniture, and provides an exceptionally wide range of goods, including such things as motor tyres, fertilisers, wood-wool and synthetic nitrogen. But its chief claim to the interest of British architects is the exceptionally high standard of design of all its products, whether buildings, furniture or packaging. The achievement of quality—in the widest sense—appears to be its aim, rather than mere low cost. No account of Swedish architecture would be complete without a description of the contribution made to it by the co-operative movement.

The architect's office of the K.F. occupies an important position in the organisation. It is responsible not only for buildings but is directly concerned with all matters where design is a factor. In this it differs from many official architects' departments in Great Britain, where too often the controlling body (whether municipal or commercial) simply does not realise that the architect can contribute anything beyond the design and maintenance of buildings. One suspects that this happy state of affairs in the K.F. is not a little due to the personality of the Chief Architect, Professor Sundahl who, appointed in 1924 with an original staff of two, has exerted a strong influence not only on the K.F. itself but on Swedish national life as well. It is significant of the esteem in which he is held by his fellow architects that Professor Sundahl is, this year, Chairman of the Svenska Arkitekters Riksforbund, a position equivalent to the Presidency of the R.I.B.A. The architect's office now has a staff of 118 persons. While mere numbers on a staff are no indication of the quality of work done, they do indicate both the scale of operations and the fact that the directors of the K.F. believe the work of their architect's office to be of value. The office has designed factories, offices, shops, stores, warehouses, popular restaurants, dwellings for employees, furniture, glassware, electric fittings, packagings, etc. It has





Two co-operative shops. Above and to the right is a shop at Bomsarvet, Borlänge, by E. Ahlsén, showing the clerestory lighting over the counter space which, as shown in the top right view, throws a strong light on the display on the back wall. The lower view of a shop at Fagensta, also by Ahlsén, illustrates the typical shallow depth and unobstructed front window now favoured by the architects of the Swedish Co-operative Society.

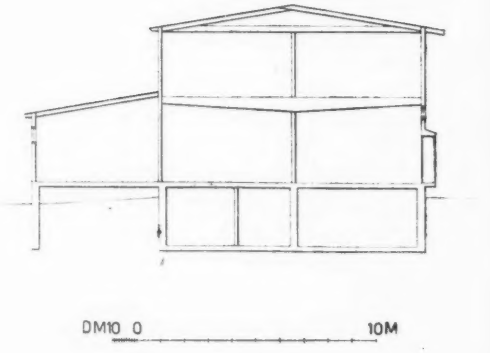
built a little theatre in Stockholm and some open-air theatres in the country and has recently turned to the design of schools.

When the party of British architects visited Sweden last August, a day was devoted to the work of the K.F. The day began with a talk by Professor Sundahl, a talk from which the following notes on the origins and organisation of the K.F. have been taken. These notes give the background necessary for a proper understanding of the architectural work. Professor Sundahl said :

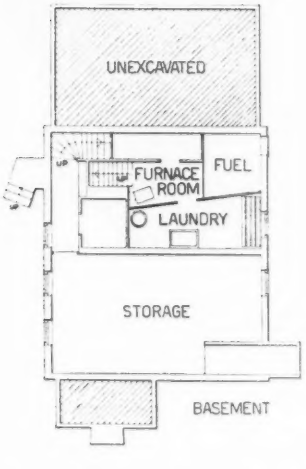
"The first consumer co-operatives in Sweden were started about the middle of the 1860's. The very first co-operative of all was formed in 1851—only a few years after the Rochdale Society. For a long time the co-operatives remained small and weak in both rural and industrial areas. Only when a national body was established—at a congress in Stockholm in 1899—did the movement attain any great measure of stability. Some forty societies were represented at this congress, and they founded Kooperativa Fö.bundet (K.F.), the Swedish Co-operative Union and Wholesale Society, which was initially only a union of consumer co-operatives, but later also became their joint wholesale supplier. During the 47 years which have passed since then, a strong consumer co-operative movement has been built up in Sweden. By conducting an incessant publicity campaign against shop credit, the movement has succeeded in liberating its members from the toils of credit and in putting them on a sounder financial footing.

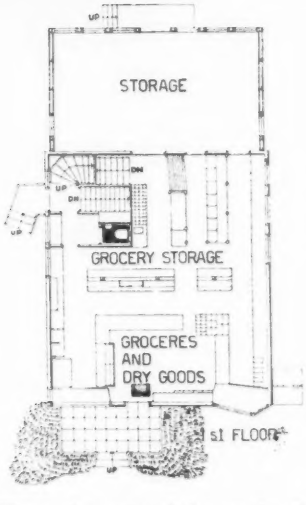
As regards organisation there are considerable differences between the various co-operatives. There are societies of almost all sizes. In the larger towns and more thickly-populated areas the co-operatives are almost without exception of considerable magnitude, with many shops. In the rural districts there are, relatively speaking, many big co-operatives, covering wide areas with an extensive network of shops. The majority of the rural societies are, however, comparatively small with only one or a few shops each. But they all make their purchases through the Kooperativa Förbundet. The Stockholm Co-operative Society, for instance, has 122,391 members, 705 shops, and a turnover of more than 12 million pounds a year. The entire membership of the Swedish consumer co-operatives was about 830,000 at the end of 1945, each usually representing a family.

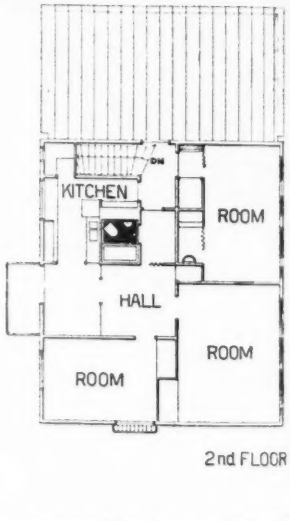
The consumer co-operatives in Sweden are strictly neutral as regards political and religious matters. They have won supporters within all occupational groups and social categories. About 20 per cent. of the members are independent farmers, tenant farmers and farm workers ; more than 8 per cent. are craftsmen, and about 40 per cent. are industrial and other workers. The remaining members represent various pro-



Country co-operative store at Lingbo with flat for the manager above. Note the clerestory lighting over the main shop windows, from which the light is reflected downwards over the interior by a sloping ceiling. The building is self-contained and has no unheated outhouses, a necessity in a cold climate.







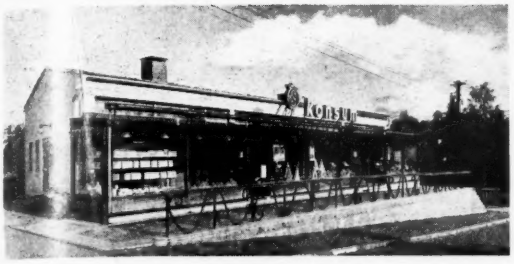
fessions—doctors, authors, journalists, etc., or are civil servants or private employees. Independent traders, too, have become members of the societies. A considerable part of the retail trade of Sweden is transacted by the consumer co-operatives.

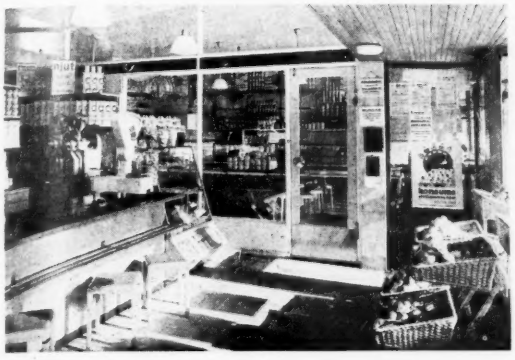
It was originally intended that the central body, Kooperativa Förbundet, should be only a connecting link between the local consumer co-operatives and a medium of co-operative propaganda. In 1904, however, the K.F. began to act as a wholesale buyer to the local co-operatives. Much the greater part of their purchases to-day passes through its hands. But there is no obligation on their part to buy through the K.F.

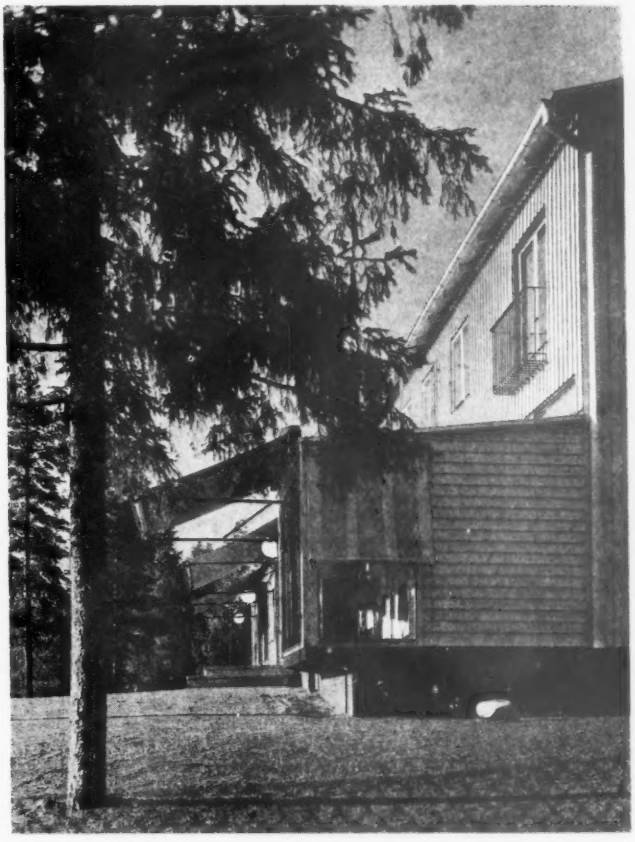
The major part of the goods which Kooperativa Förbundet supplies comes from its own factories and mills. Some of these production plants were started in trades where private monopolies had extracted an unduly high price for the goods produced. In taking these steps the co-operative movement paid attention to other factors of a social and economic character, such as the national economic interest in maintaining employment in the trade as a whole. When the productive apparatus was already sufficient to meet the country's needs, privately-owned factories were bought and modernised. The general view in the co-operative movement is that the K.F. shall serve the whole community by its industrial activity. When favourable opportunities have arisen, therefore, the K.F. has also established new industries, and in some cases has been a technical and economic pioneer.

The Swedish Consumer Co-operative movement has established many international connections and has obtained many business and administrative ideas from the co-operative movements in other countries, first of all and most consistently from Great Britain and the Scandinavian countries. In some fields, too, the K.F. has given a lead, and taken an active part in establishing international co-operative business organisations.

The whole structure of the Swedish Co-operative movement is an expression of economic democracy. Hence the







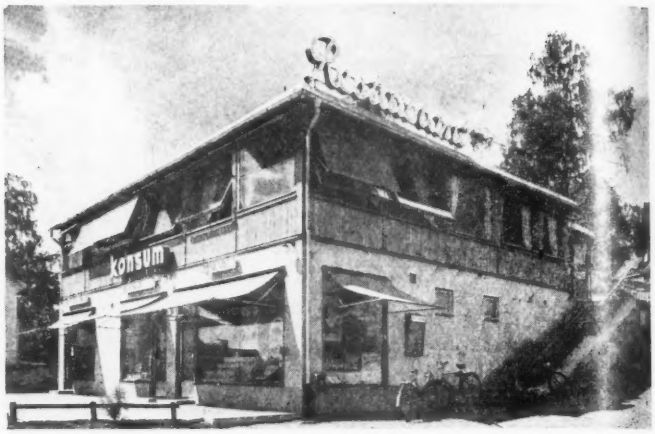
Above and below, a suburban shop at Mälarhöjden with clerestory light over the public space, typical shallow plan depth and unobstructed front window. Right, a shop at Idkerberget, Borlänge. Both buildings are by E. Ahlsén.

movement has devoted special attention to educational work. In the course of its development in various spheres the Swedish Co-operative movement has won general approbation as a progressive, creative, and stabilising element in Swedish economic life. Its measures against regimented economy and other forms of economic bondage, have placed it in the front rank of the guardians of liberty."

The K.F. building best known to British architects is its famous headquarters, situated at the equally famous Slussen cloverleaf crossing. (See head of article p. 168). The building itself is interesting for its spinal plan with bays facing an arm of the sea and a view over Stockholm, but its most eye-taking feature is the lift and bridge (with restaurant slung beneath) which communicates by way of the flat roof and another bridge to a hill behind. The restaurant is called the Gondolen—after the gondola of that now extinct species of flying machine, the airship—which dates the building with some precision. The flat roof of the main building is laid out as a garden, much used by the staff, and is equipped with shower baths for those who indulge in Swedish exercises in the lunch interval.

After the headquarter building, the shops and restaurants claim attention. They are to be seen all over Sweden, being easily recognised by the standard "Konsum" sign. While fittings and equipment are generally standardised, there is an engaging variety of plan observable and much interesting experiment. This is due, to no small extent, to the encouragement of individual architects by giving them responsibility for individual jobs. There is indeed nothing approaching the monotonous repetition of form, colour and equipment which characterises too many chain stores in Great Britain. Not only are the standardised details improved as new ideas are developed, but they are devised with the special purpose of enabling the manager to change the appearance of his shop from time to time. This last idea is very different from the accepted tenets of chain store design in Great Britain and one can only assume it to be based on a deep study of sales technique.

The principles guiding the design of shops include, first, the attainment of a high standard of hygiene. All surfaces and fittings are easily cleaned; inside the door is a grating to reduce the amount of dirt and snow carried in on boots; the public space is floored with a hard, washable material, usually tiles or marble; the space for the staff is, on the contrary, floored with linoleum or teak which, though easily cleaned, is softer to the feet; separate compartments are provided at the back of the shop for fish, soap, soda and other goods likely to be messy in handling; a separate room is provided for flour bins to reduce dust in the rest of the shop. A second principle is the provision of abundant light, both artificial and daylight, while the effect of cleanliness and good light is enhanced by the use of glazed screens and doors of plate glass between departments. Good daylighting is due partly to the adoption of a shallow plan, a depth of five metres being usual, partly to the practice of not filling the windows with goods but making, as it were, the whole shop fulfil the function of window, and partly to



Top left and below, a restaurant at Fagensta. Top right, shop and restaurant at Vástanfors. The architect for both buildings was E. Ahlsén.

the adoption of various forms of clerestory lighting, at least in some of the newer shops.

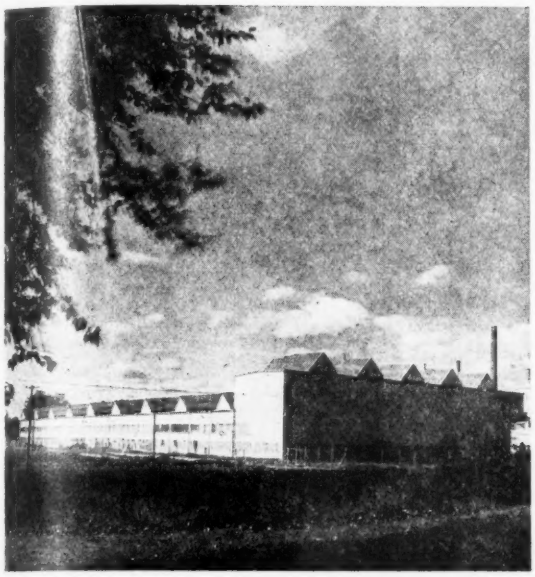
The shop illustrated at the top of page 169 has a clerestory over the counter line which floods the stands and shelves at the back of the shop with light, it being a principle of K.F. shop design that the goods themselves shall form the decoration. Another form of clerestory light is shown on page 171 ; here it is situated over the customer space. That this idea of clerestory lighting need not be wholly abandoned in a multi-storey building is shown by the country shop illustrated on page 170. This shop has the manager's flat above. A range of clerestory lights over the rather small shop windows throws light on to a sloping white ceiling whence it is reflected down over the customer space. The plan also shows that the shop windows are here accessible from behind the counter space. It must not be overlooked, however, that this clerestory light has possibly more value in Sweden than it would in this country because of the strong summer sun and the reflected light from snow in the winter. The effect would not be the same in, say, a Manchester street.

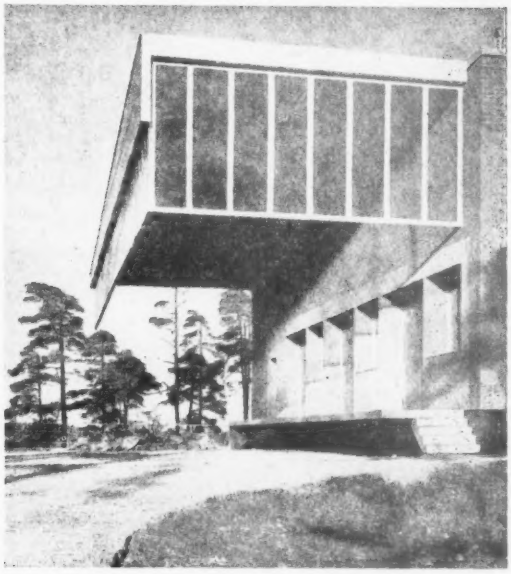
Restaurants are sometimes separate from the shops and sometimes associated with them, as at Vástanfors (top right above). The generous allotment of window space is notable, allowing as many customers as possible to have " a seat by the window." The interiors have the typical Swedish white or off-white colouring and figured furniture of beech, birch or light oak.

The factories are mostly situated in rural surroundings, like the china factory at Gustavsberg with dwellings for the workers dotted about in pinewoods nearby. The general grouping is almost always charming, though one would have to be a very bad architect to spoil the typical delightful Swedish site of rocky tree-clad slope near lake or stream. Swedish architects owe not a little to the opportunities offered by their abundance of magnificent building sites.

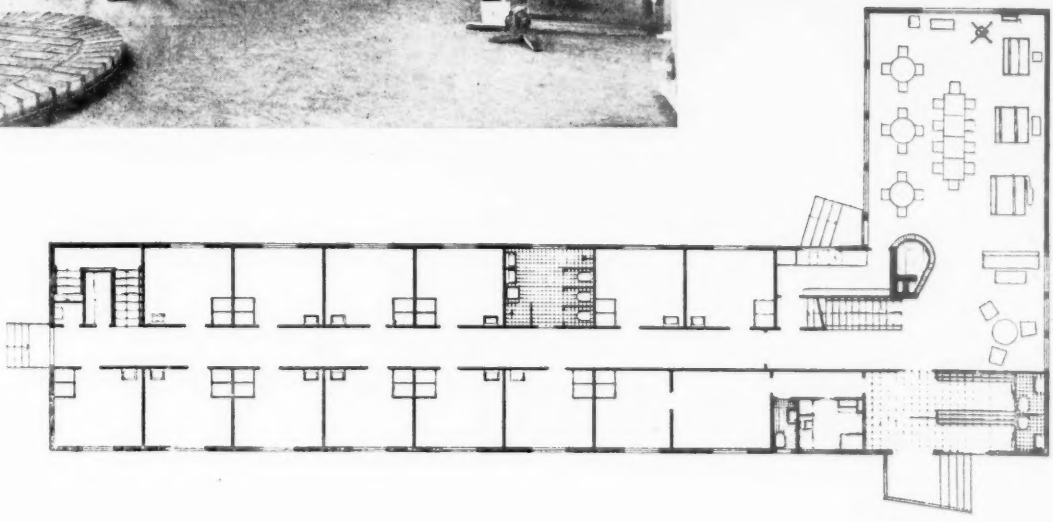
The newer factory buildings are

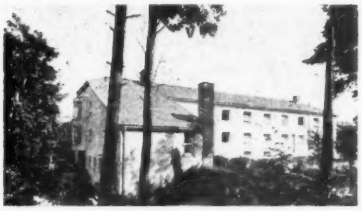
(*continued on page* 176)



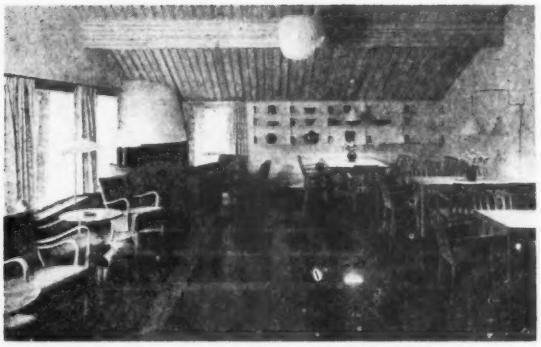


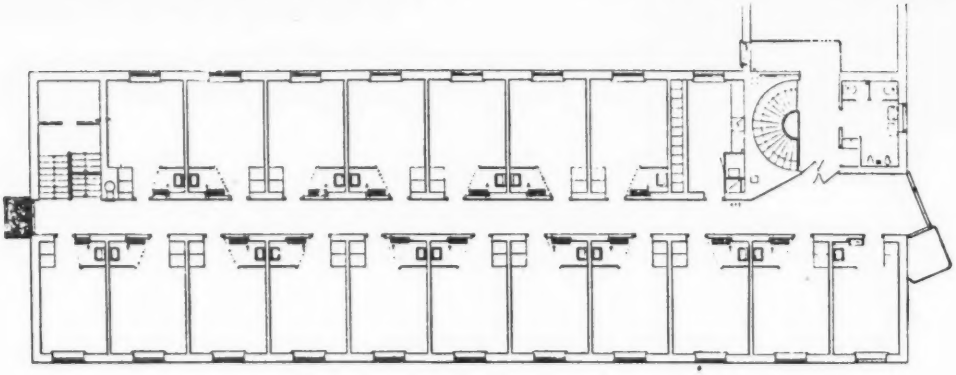
Top left, the china factory at Gustavsberg is in pleasant rural surroundings. Below is the ground-floor plan and a view of the living-room of a hostel for workmen at Gustavsberg. The architect for both buildings was O. Thunström. Top right, loading dock of a recent "hard bread" factory at Kvarnholmen, near Stockholm.

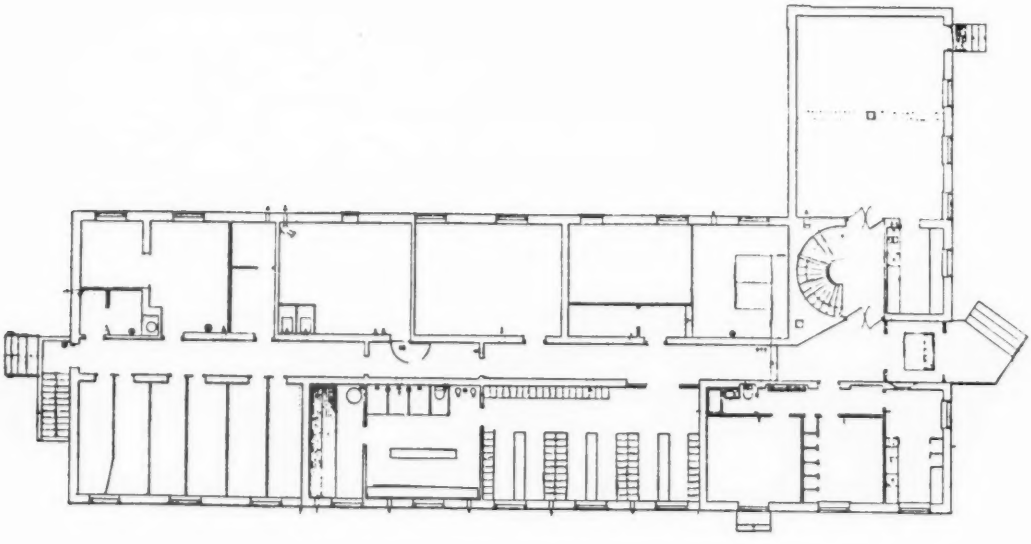




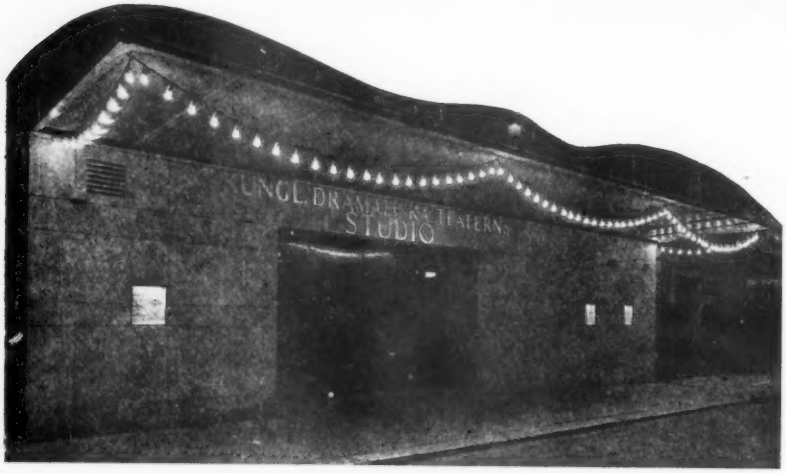
Views and plans of the boys' hostel at Gustavsberg. Architect O. Thunström. The interiors are of the main lounge and show a typical canopied open fireplace for burning wood, the sloping timber ceiling and marble floor. The ground floor contains (middle of the lower plan) the locker room, dressing and shower room and steam room of a Finnish bath.

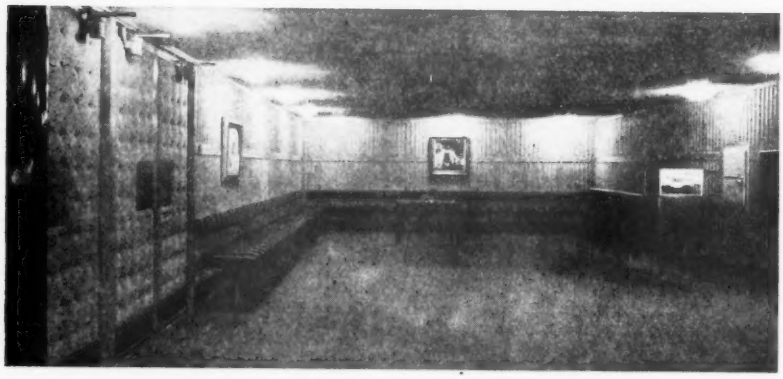






Two typical interiors of workers' dwellings and some pieces of the mass-produced inexpensive furniture made and sold by the Swedish Co-operative Society. The upper view is of an actual living-room ; the lower one is an exhibition arrangement.





Three views of the Dramaten Studion, an intimate theatre built in Stockholm by the Swedish Co-operative Society. The architect was E. Ahlsén. Above, the entrance ; middle, the foyer ; below, the auditorium and stage seen from the foyer.

mostly constructed of reinforced concrete with flat roof decks and steeply sloping glazing ; the slope is to shed the snow, which would otherwise break the glass. Timber trusses are to be found in the older buildings, but some of the more recent ones have steel trusses. The British architects observed one interesting roof structure consisting of lattice trusses inclined at an angle of 45 degrees and supporting pre-cast concrete roof decking lying down the face of the truss ; roof glazing connected the top member of one truss with the foot of the next. Generally the factories compare favourably with food factories in Great Britain, though in ours the hand of the architect is usually not so apparent.

Hostels are now being provided for unmarried workers. Plans and views of one such hostel are shown on page 174. This is for boys ; its public rooms contain, in addition to a large marble-floored lounge with open fireplace, changing rooms and a Finnish steam bath (somewhat akin to the Turkish bath but rather more spartan) workshops and a kitchenette on each bedroom floor where boys can prepare their own light meals ; principal meals are taken in the factory canteen. A hostel for older unmarried workmen is shown at the bottom of page 173.

One cannot classify these hostels either as homelike or institutional in the English sense. Their white walls and spotlessly clean floors, their absence of decoration, carpets and pictures give them a slightly austere appearance ; on the other hand there are no glazed brick corridor walls or other sign of having to resist hobnailed boots. They are doubtless warm and convenient, but no one could label them either cosy or forbidding.

The housing for employees consists either of blocks of flats, even in rural surroundings, or of small houses, usually of timber. We shall be discussing Swedish housing in a later article and it can be said here that K.F. housing is not dissimilar from that provided by H.S.B., the national housing corporation. The standards of accommodation are lower than in Great Britain, but the equipment is better than that of the typical British council house before the war. The small houses are simple and unpretentious and set in small gardens, many of which are unfenced or have hedges only a foot or two high. A typical co-operative prefabricated timber house is shown on the front cover.

The simple mass-produced furniture is invariably of very good design. More important, it appears to be accepted and used by the lower paid workers. A tastelessly furnished or ill-arranged worker's dwelling is extremely rare. The illustrations of interiors on page 175 are not untypical, though one of them is a "show" arrangement. K.F. also supplies furniture and textiles to H.S.B. for sale to their tenants and, of course, to shops for general supply.

K.F., though doubtless a profit-making concern, does not appear to the foreigner to be interested in profits to the exclusion of the welfare of its workers, nor of good design as an end in itself. It seems to take its social responsibilities very seriously both towards its workers and the general public.

E. L. B.

SOLAR HEAT GAIN THROUGH WINDOWS*

By N. S. BILLINGTON, M.Sc.

Summary

From a theoretical analysis of the heating effects of sunshine, it appears that in this country the differences in the amounts of fuel required for heating rooms with large or small windows are not generally considerable; but that for East and West walls, small windows are to be preferred. Nevertheless, the choice might well be left to the individual architect, who is thus freed from the necessity of considering the factor of heat loss in making his decision.

.....

Within recent years, a number of houses have been built in America with an extensive area of glazing, with the object of taking advantage of solar radiation during winter and so reducing the fuel consumption for heating. The results so far obtained have not been very conclusive, and they appear to depend in part at least on the method of heating employed. The whole subject of solar heating is now being studied in a comprehensive programme at Purdue University. Two single-storey houses, of similar size and plan, have been erected there, one having 12 per cent. of the wall area glazed, and the other having 22½ per cent. of glass. In the latter case, 51 per cent. of the south wall is glazed. Double glazing is used throughout. It has so far been found that in the unheated houses, the mean air temperatures during two winter months were as follows:—

Outdoor temperature	26 deg. F.
Orthodox house	33 deg. F.
"Solar" house	36 deg. F.

The daily variation of temperature was greater in the solar house than in the orthodox house, the former being warmer by day and colder at night. During the tests, there was a daily average of about three hours sunshine—which is not obtained in England during winter.

It has been suggested that in this country also advantage might well be taken of sunshine to reduce fuel consumption. It is known, for instance, that a north-facing room required 17 per cent. more heat than a south-facing room during a complete heating season. Since this heat enters the house chiefly in the form of sunshine through the windows, it is argued that the larger the window, the larger also is the heat gain and the less the fuel used.

On the other hand, the provision of a large window substantially increases the maximum rate of heat loss; and the direction in which lies the greatest advantage is not immediately obvious. It is well to remember that the modern tendency towards large windows does not result only from considerations of adequate daylighting, but is largely due to the æsthetic appeal of the big window.

In the absence of any experimental evidence as to the value or otherwise of large windows, it has been thought to be of interest to attempt a theoretical analysis of the problem. To do this, the heat loss and the solar heat gain through a window must be computed, and the net gain resulting from replacing one square foot of wall by glass is then calculable. The general problem is a complex one, and there are many factors peculiar to each case. We may, however, make some progress by considering a special case; and accordingly we shall make the following assumptions:

(*a*) An air temperature of 65 deg. F. is maintained within the room for 9½ hours a day; and a temperature of 50 deg. F. is maintained for 14½ hours.

(*b*) Part of the period of heating to 65 deg. F. will occur during the hours of darkness, and part during daylight, according to the following table.

Hours of Daylight	6	8	10	12	14
Room heated to 65°F. in daytime	1½ hr.	2 hr.	4 hr.	5 hr.	6 hr.
Room heated to 65°F. in darkness	8 ,,	7½ ,,	5½ ,,	4½ ,,	3½ ,,
Room heated to 65°F. in daytime	4½ ,,	6 ,,	6 ,,	7 ,,	8 ,,
Room heated to 65°F. in darkness .. .	10 ,,	8½ ,,	8½ ,,	7½ ,,	6½ ,,

(*c*) The thermal transmittance of the opaque portions of the wall is U B.Th.U./ft.²/hr./°F. (the value appropriate to the orientation being selected).†

(*d*) During the hours of darkness the window is curtained, and the thermal transmittance of the window is then as given in the table below† :—

Orientation	N.E.	S.E., S.W., W.	S.
(i) Daytime	1.00	0.88	0.79
(ii) Darkness (glass curtained) ..	0.70	0.65	0.60

(*e*) There is no obstruction to prevent sunshine falling on the wall.

The direct solar radiation falling on a vertical wall has been calculated from the expression :—

$$I_h = SI_o k^{\operatorname{cosec} e} \cdot \cos e \cdot \cos h.$$

where I_h is the solar intensity at hour h.
S is the fraction of hour during which the sun shines at hour h.
I_o is the solar constant (2 cal./cm.²./min.)
k is the transmission coefficient of the atmosphere.
e is the solar altitude at hour h on 15th of each month.
h is the angle of the sun from the normal to the wall.

Values of I_h for a south wall at Kew were obtained from the Meteorological Office, as were values of e and h for Manchester and Aberdeen. The duration of sunshine in each locality was obtained from the Book of Normals, which was also the source of other meteorological data. The values of I_h for Manchester and Aberdeen were computed from the values of e and h using the values of k and S given for Kew (local information was not available), and the computed figures were then corrected for differences in hours of sunshine.

The indirect short wave radiation was obtained from measurements of the monthly mean values of radiation in Oxfordshire, described by Dines and Dines. In the absence of other data, this was assumed to be the same for all localities. The long wave radiation which does not penetrate glass has been neglected.

All this data was evaluated for walls facing E, SE, S, SW, and W.

The heat loss through the wall and the glass was computed from the mean monthly temperatures in each locality and from a knowledge of the hours of daylight in each latitude. (Table 1).

The replacement of one square foot of wall by an equal area of glass results in a net gain or loss of heat, equal to the difference between the solar gain and the increased heat loss by normal transmission. The results of the computation are given in Tables 2 to 5. Table 2 shows the total solar radiation falling on

† The dependence of U on orientation arises from the fact that the external surface resistance is not a precisely defined quantity, but is influenced by a number of factors, including wind and sun, and may therefore vary within fairly wide limits. The effect of sunshine is probably small compared with that of wind; and little error will be introduced by using accepted values of U, assuming that the whole of the variation is due to wind without attempting to make any correction for the effect of sunshine.

TABLE 1.—METEOROLOGICAL DATA

Locality		Month							
		Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Kew	Mean temp.	57.5	51.0	43.8	41.5	40.5	40.7	43.1	47.1
	Hours sun.	4.83	3.02	1.79	1.20	1.43	2.14	3.31	4.98
	Hours daylight	12¾	10¾	9	8	8½	9¾	11¾	13¾
Manchester	Mean temp.	56.2	50.2	43.4	40.9	40.4	40.3	42.5	46.3
	Hours sun.	3.45	2.13	0.91	0.40	0.59	1.30	2.28	3.64
	Hours daylight	12¾	10¾	8½	7½	8¼	10	12	14
Hoylake	Mean temp.	56.5	50.9	44.1	41.9	41.3	40.8	42.7	46.5
	Hours sun.	4.36	3.00	2.10	1.40	1.69	2.33	3.37	5.30
	Hours daylight	12¾	10¾	8½	7½	8¼	10	12	14
Aberdeen	Mean temp.	52.5	47.7	42.2	39.7	39.0	39.3	40.3	43.2
	Hours sun.	4.12	3.09	2.00	1.18	1.43	2.39	3.47	5.03
	Hours daylight	13	10¼	8	6¼	7½	9¼	11¼	13¼

TABLE 2.—SOLAR RADIATION FALLING ON VERTICAL WALLS. (*B.Th.U./ft.² day*)

Locality	Orientation	Month							
		Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Kew 51°N.	E	246	173	58	34	49	71	153	272
	SE	440	356	152	91	131	175	292	401
	S	577	471	211	123	179	243	387	462
	SW	498	371	165	96	139	191	315	417
	W	302	186	68	36	55	82	173	287
Manchester 53°N.	E	195	144	46	25	36	57	123	209
	SE	338	271	92	42	62	117	221	313
	S	437	351	120	51	77	155	290	359
	SW	378	281	99	43	65	125	236	322
	W	234	152	50	26	37	63	136	221
Hoylake 53°N.	E	226	171	60	33	46	73	154	276
	SE	408	349	166	91	123	180	300	425
	S	529	463	230	125	165	248	400	498
	SW	458	363	180	96	131	194	322	442
	W	275	182	70	36	50	83	173	280
Aberdeen 57°N.	E	208	157	52	26	36	64	138	254
	SE	385	330	129	53	73	154	277	405
	S	503	435	173	67	92	209	367	484
	SW	430	342	136	55	74	164	293	419
	W	251	166	58	28	37	71	152	269

a vertical surface facing in various directions ; Table 3 gives the heat loss per sq. ft. of wall ; Table 4 that per sq. ft. of glass ; and Table 5 shows the net gain or loss of heat resulting from the change, and is [(2) + (3) − (4)].

It will be seen that the net heat gain (over a heating season) for a SW wall is only about two-thirds that for a S wall ; for other orientations the gain is even less. The net gain is greatest at Kew, and decreases as one proceeds northwards. During the winter months, the gain (at Kew) never much exceeds 100 B.Th.U./ft.²/day.

It is well to get these figures in a proper perspective. The total gain for a S window at Kew over the eight months, September to April, is 30 × 1865 B.Th.U./ft²., of which half occurs in September and April. In mid-winter, the gain is less than 100 B.Th.U./ft.²/day, so that with a 10 ft.² change in window area, the gain would be less than 1,000 B.Th.U./day. This is equivalent to about one-third of a pound of coal burnt in an open fire, or to eight minutes' use of a 2-kW. electric fire. Sunshine is often intermittent, and these savings would be well-nigh impossible of achievement.

We must now discuss the various assumptions made.

(*a*) A reduction of the temperature to which the room is heated, or of the duration of the heating, reduces the total heat loss from the room ; and thus the net solar gain is increased. But when the duration of heating is reduced, the *hourly* gain is not altered, so that additional fuel economy is not possible.

(*b*) One may consider that the effect of sunshine is to raise the general temperature of the room, independently of any heating ; and thus we see that in an unheated room, the use of large windows will result in higher temperatures on sunny days. But, as found at Purdue, it also results in lower night temperatures.

(*c*) A reduction of the thermal transmittance of the wall, by improving the insulation, decreases the heat loss per sq. ft. and so diminishes the net heat gain from sunshine due to replacing wall by window glass. This means in effect that even in a south wall, nothing is gained by using large windows in a well-insulated building, and in fact, an increase in fuel consumption may result.

(*d*) Dufton has recently found that when a north-facing window is curtained for 16 hours during the night period, the average daily heat loss is reduced by from 19 to 27 per cent. depending on the thickness of the curtains. Sheard had earlier reported that the mean transmittance of a wall containing a window occupying 20.4 per cent. of the total area was 0.51 when the window was clear, but fell to 0.46 when the window was curtained. It may be deduced that the corresponding figures for the window alone are about 0.86 and 0.61—a reduction of about 30 per cent. The two observers agree in the general effect of

TABLE 3.—HEAT LOSS PER SQ. FT. OF WALL. (*B.Th.U./ft.² day*)

Locality		Month							
		Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Kew	U = 0.1	7	13	29	35	37	37	30	21
	U = 0.2	14	27	58	69	74	73	60	43
	U = 0.3	21	40	87	104	111	110	90	64
Manchester	U = 0.1	8	14	30	36	37	38	32	23
	U = 0.2	17	28	60	72	75	75	65	46
	U = 0.3	25	42	90	108	112	113	97	69
Aberdeen	U = 0.1	12	20	33	39	41	40	38	32
	U = 0.2	24	40	66	78	82	80	75	63
	U = 0.3	36	60	99	117	122	120	113	95

TABLE 4.—HEAT LOSS PER SQ. FT. OF GLASS (*B.Th.U./ft.² day*)

Locality	Orientation	Month							
		Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Kew	E, N	62	112	235	272	291	302	257	188
	SE, SW, W	56	102	213	247	265	273	231	168
	S	51	92	195	225	243	247	210	153
Manchester	E, N	73	119	242	283	293	310	276	204
	SE, SW, W	65	107	221	257	267	280	248	183
	S	59	97	200	235	245	255	227	165
Aberdeen	E, N	104	164	259	299	327	322	320	276
	SE, SW, W	94	148	236	273	292	292	287	248
	S	85	135	215	250	266	266	261	224

TABLE 5.—NET HEAT GAIN. (*B.Th.U./ft.² day*)
(Calculated for U = 0.3. Gain + or Loss−)

Locality	Orientation	Month							
		Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Kew	E	205	101	−90	−134	−135	−121	−14	148
	SE	405	294	26	−52	−23	12	151	297
	S	546	419	105	2	47	106	267	373
	SW	463	309	39	−47	−15	28	174	313
	W	267	124	−54	−107	−99	−82	32	183
Manchester	E	147	67	−91	−155	−145	−140	−56	74
	SE	298	206	−39	−107	−93	−50	70	197
	S	403	296	25	−81	−56	13	160	263
	SW	338	216	−17	−111	−90	−42	85	208
	W	194	87	−81	−123	−118	−104	−15	107
Hoylake	E	178	94	−92	−142	−135	−124	−25	141
	SE	368	284	35	−58	−32	13	149	311
	S	495	408	120	−2	32	106	270	402
	SW	418	298	49	−53	−24	27	171	328
	W	235	117	−61	−113	−105	−84	22	166
Aberdeen	E	140	53	−108	−156	−169	−138	−69	73
	SE	327	242	−8	−103	−97	−18	103	252
	S	454	360	57	−66	−52	63	219	355
	SW	372	254	−1	−101	−96	−8	119	266
	W	193	78	−79	−148	−133	−101	−22	116

curtains, but they do not agree as to the transmittance of a window, and the differences are no doubt due to the use of wooden frames in one case and of metal frames in the other. It has been thought desirable, therefore, in the present calculations to make use of the values given by the Institution of Heating and Ventilating Engineers, which seem to be of the same order as Sheard's data for metal windows. A correction of 25-30 per cent. is applied to these figures to obtain the values for curtained windows. The following values are thus obtained :—

Orientation	N.E.	SE, SW, W.	S.
Window uncurtained ..	1.00	0.88	0.79
Window curtained ..	0.70	0.65	0.60

If the transmittance of the window is less than that assumed, then the case for large windows is a little more favourable than appears from the above analysis. As an extreme case, we may note that double glazing would make solar heating much more profitable. On the other hand, if by the use of thinner curtains or less well-fitting ones, the transmittance of the curtained window is more nearly equal to that of the clear window, the results of the analysis are too favourable.

(*e*) Reduction of the amount of solar radiation falling on a wall has a very great influence on the net heat gain. This is illustrated by a comparison of the data for Manchester and Hoylake. In the city, the recorded hours of bright sunshine in winter are halved, as compared with the seaside, by the atmospheric pollution ; and the intensity of the sunshine is also reduced, though owing to lack of data, no allowance can be made for this in the computation. Similar reductions may also follow

by the shading of the window by trees or nearby buildings—a completely unobstructed window is a rarity in an urban area. This being so, it will be appreciated that the solar heat gain will generally be less than that shown in the Tables.

It has also been assumed that sunshine falling on an opaque wall is of no value. In fact, a small proportion—about 5 to 10 per cent.—of the radiation is absorbed and transmitted to the inside of the building. This correction is, however, small compared with the possible variations in pollution or insolation, and it is hardly worth while attempting to make it.

The possibility of making use of the heat gained depends to a large extent on the use of thermostatic control of the heating appliance. The example given earlier shows that manual control is likely to be impracticable. Even with thermostatic control, the gains in September and April may not be effectively used, as a large part occurs in the middle of the day, when the heat requirement is least. Some overheating may occur at these periods—though the temperatures would not be uncomfortably high, but merely higher than the specified required temperatures. It may also be mentioned that in a house in the latitude of Chicago, the anticipated savings were not realised owing to the time lag in the floor-heating system adopted.

There are a number of other points which also require consideration in a discussion of large versus small windows; but many of these are not amenable to calculation, and general statements must suffice.

The summer conditions in a south-facing room with a large window might become intolerable, though they can be mitigated by the use of awnings. (The summer sun is lower in England than in America.) Condensation will occur on a glass window in winter even when conditions are not severe enough to cause deposition on other walls, and this may be a source of annoyance. A glass wall is inferior to most building materials (and especially to insulating materials) in respect of the rate of warming; and would therefore be disadvantageous when heating is intermittent. It may also on this account partly offset the predicted fuel savings, since a longer preheating period would be necessary.

It has also been shown that to secure a comfortable environment, not only must the gross rate of heat loss from the body be correct, but the relative amounts lost by convection and radiation are important. Further, the direction of the radiation is of some importance. The most comfortable conditions are likely to be those in which the temperature of the surroundings is reasonably uniform. The surface of a wall of transmittance 0.3 will be at about 60 deg. F. when the inside temperature is 65 deg. F. and the outdoor temperature 40 deg. F. The corresponding temperature of a window would be about 50 deg. F. An increase in window size would thus lead to a reduction in the mean radiant temperature, and to less uniform conditions which might easily become uncomfortable. Floor draughts would also be increased; and extra fuel might be needed to counteract the cooling effect of such draughts. One must also bear in mind that an increase in window area leads to a greater maximum demand for heat, so that a larger heating appliance will be necessary.

Against these arguments, one may set the æsthetic and psychological factors. Many prefer a large window for these reasons. And indeed in some localities window areas in excess of those given in "Lighting of Buildings" may be needed because of diminution of daylighting by pollution.

It has been said that large windows provide a means of saving fuel without the extra cost and complexity of construction involved by insulating a house. It is true that the theoretical economies are of the same order of magnitude, but there are important differences. The use of insulation makes possible the use of a smaller heating appliance; it increases the mean radiant temperature; and has the greatest effect on fuel consumption in midwinter.

Generally speaking, it appears that the amounts of fuel involved in the choice between large and small windows are not large; but that for E and W walls, small windows are to be preferred. Nevertheless, the choice might well be left to the individual architect, who is thus freed from the necessity of considering the factor of heat loss in making his decision.

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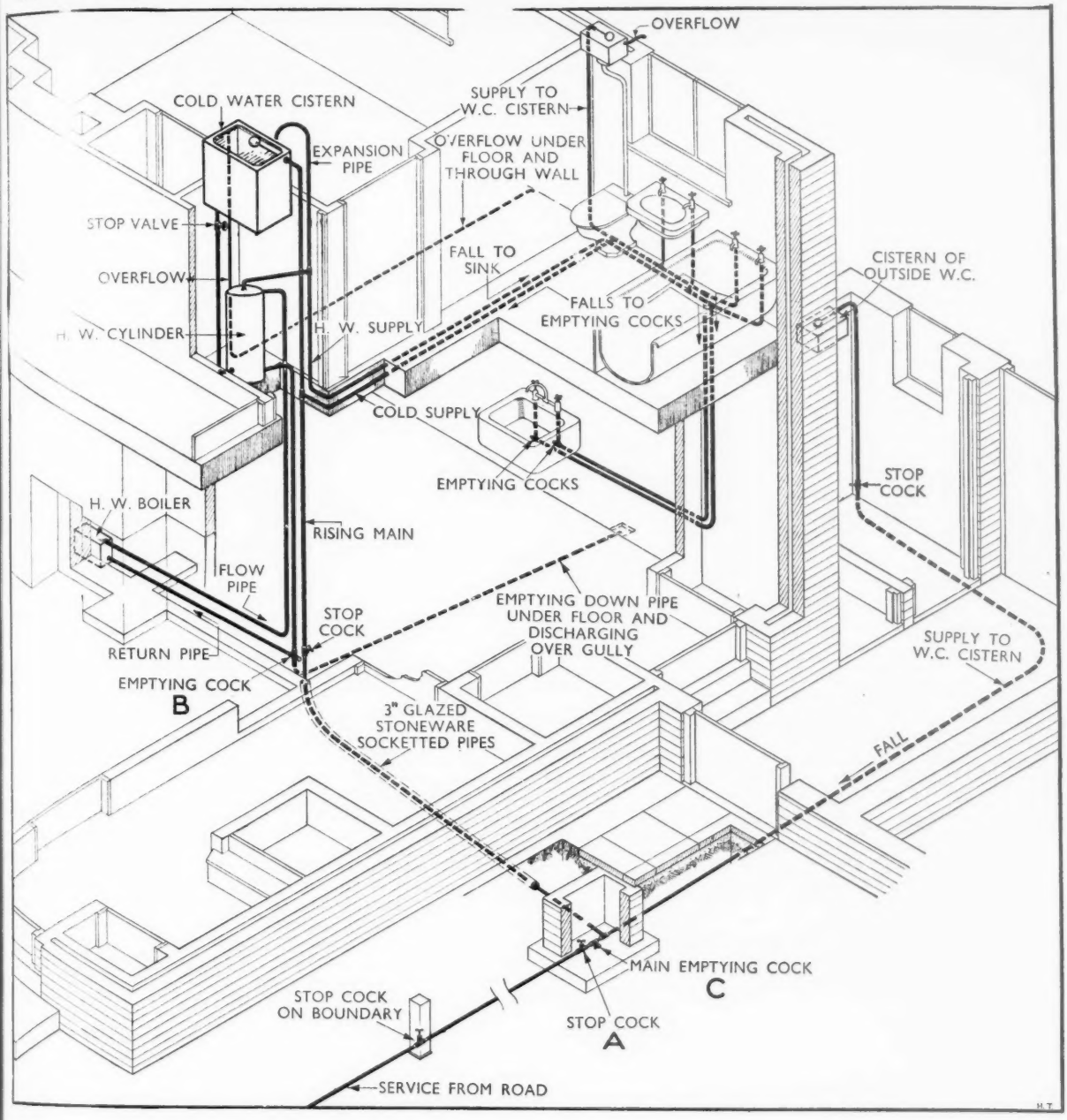
PREVENTION OF FROST DAMAGE TO WATER INSTALLATIONS IN SMALL HOUSES

The Housing Manual and many official publications have stressed the importance of attention to the prevention of frost damage to water installations in small houses. Such damage can be a particularly heavy item of expenditure in years when prolonged periods of frost occur. Records kept by the Bournville Village Trust show that in the hard winters of 1940 and 1941 no less than £120 per annum was spent in repairing burst pipes, etc., on only 360 houses. A similar sum was spent on making good damage caused by the short period of heavy frost at Christmas 1944. During mild winters the average expenditure was about £40.

Unpredictable heavy calls upon the services of plumbers hamper the running of an efficient and balanced repairs' department and it is, therefore, important that water installations should be as frostproof as possible. The greater proportion of frost bursts result from the placing of pipes, tanks, etc., on north walls and in roof spaces and other exposed positions without adequate lagging. But even the most carefully designed installation is liable to freeze if left full of water in an unheated house during frosty weather. The Housing Manual recommends, as a precaution against this, the provision of draw-off pipes or emptying apparatus.

The scheme, illustrated in the isometric drawing, which has been designed by the Bournville Village Trust Architects' Department in collaboration with the Chief of the Maintenance Department, is being installed in 60 houses now being built. Although it does not make use of any special apparatus it may be of some interest as an example of the application of sound principles to the internal plumbing of the small house.

The chief points that should be noted particularly are as follows:—Cold water service pipe is pulled through a stoneware duct after the building is roofed and is carried to the middle of the house. Rising main runs adjacent to the flow and return pipes, and all hot and cold supply pipes to fittings are grouped to reduce risk of freezing. Cylinder and cold water cistern are both located in the airing cupboard in the middle of the house near to the stack. Supply pipe to external W.C. is carried underground. All pipes are laid with falls to drainage points.



The whole installation, excepting the cold cistern, is in copper—soft temper tubing being used for the underground services.

To empty the cistern the stop tap A in the external pit is first screwed down, thus cutting off water supply to both hot and cold installations. All taps on sanitary fittings are turned on and the cisterns of W.C.s flushed, thus emptying the cold cistern and most of the hot and cold supply pipes. The plug B on emptying-down pipe is opened to draw off the contents of boiler and cylinder. Finally, plug C in the external pit and the two plugs under sink are opened to draw off the small amount of water still remaining in the supply pipe to the external W.C. and in the rising pipe connected to the taps of sanitary fittings. On test, the time taken to cut off water supply and to open the drainage cocks and valves was two and a half minutes.

After the plugs have been closed the installation may be completely refilled by turning on the main stop tap A. The taps on the sanitary fittings should remain open for a time to prevent airlocks.

One difficulty in relation to this system has been experienced—the local water authority has not consented to the fixing of plug A, and pending official agreement, a stop tap is being inserted on the rising main with an emptying plug immediately above it. It is hoped that this difficulty may be overcome.

FIRE RESEARCH AND PROPAGANDA

The Government has now rationalised the rather anomalous position with regard to research and public education on matters of fire protection. Before the war research on fire resistance of elements of structure was undertaken by the Fire Testing Station at Elstree. This was owned by the Fire Offices' Committee (F.O.C. for short), which is a joint committee of the tariff insurance companies. The research work at the Station was undertaken by officers of the Building Research Station. During the war the Research and Experiments Department of the Ministry of Home Security was created to study the effects of enemy attack and a section, the Fire Research Division, studied the effects of fire from air attack. F. Division, as it was called, was the only part of the R. and E. Department to survive the war, being kept in existence by the Government so that its accumulated knowledge of fire matters should not be lost; F. Division also undertook a great deal of research for the National Fire Service on equipment used by firemen. Research into hand-extinguishers, appliances, sprinklers, fire alarms, etc., has always been undertaken directly by the F.O.C.

The new set-up comprises two bodies. First, a *Fire Research Organisation* has been established jointly by the Government and the F.O.C. The Organisation is a section of the Department of Scientific and Industrial Research and is therefore roughly parallel in status with the B.R.S., F.P.R.L., N.P.L., etc. The second body is the *Fire Offices' Committee Fire Protection Association*, whose main purpose is to study fires with a special view to education of the public, to advise architects, building owners, industrialists, etc., on fire hazards, their avoidance and the prevention of outbreaks. The two bodies will naturally work in very close collaboration and their terms of reference have been agreed to this end.

The Fire Research Organisation

This will be under the guidance of a Fire Research Board, as is the case with other sections of the Department of Scientific and Industrial Research. Its purpose is to undertake research on the following principal matters: methods of preventing the occurrence of fires; fire-fighting, that is, equipment, and methods of extinguishing fires; fire resistance of buildings, properties of materials and elements of structure; means of escape; prevention of spread of fire within buildings and from building to building; fire hazards on ships, aircraft and special industrial hazards. An important feature of the work will be the compilation of the first complete nation-wide system of fire statistics in the world. The new Director of the F.R.O. is Mr. S. H. Clarke, who until recently was a senior officer in F. Division. Mr. Clarke, who is a biologist by training, was previously on the staff of the Forest Products Research Laboratory. The present offices of the F.R.O. are at 123, Victoria Street, S.W.1. A Fire Research Station is to be established. The capital cost is likely to be of the order of £75,000 to £100,000, and the ultimate annual running cost up to £50,000, both shared equally between the D.S.I.R. and the Fire Offices' Committee. As part of their contribution to the capital cost, the F.O.C. is transferring their Fire Testing Station at Elstree to the Government. The membership of the Board is as follows:—

Chairman:

Lord Falmouth, C.I.E.E., M.I.Mech.E., Head of Fire Research ("F") Division, formerly Ministry of Home Security, now D.S.I.R. Has been member and chairman of a number of public utility undertakings.

Members:

Dr. S. F. Barclay—Mechanical Engineer. Head of Research Department of Mather & Platt, Ltd.

Mr. J. W. Berry—General Manager, Royal Insurance Co., Ltd. Member of the Fire Offices' Committee.

Mr. E. L. Bird, M.C., A.R.I.B.A.—Editor of the Journal of the Royal Institute of British Architects. Member of Joint Committee of the Building Research Station and the Fire Offices' Committee on the Fire Grading of Buildings.

Sir George Burt, F.I.O.B.—Chairman, John Mowlem & Co., Ltd., Civil Engineering and Building Contractors. Chairman, Building Research Board.

Dr. S. F. Dorey, C.B.E., M.Inst.C.E., M.I.Mech.E., M.I.N.A.—Chief Engineer Surveyor, Lloyd's Register of Shipping.

Dr. P. Dunsheath, C.B.E., M.I.E.E.—Electrical Engineer. Chief Engineer and Director, Henley's Telegraph Works Co., Ltd.

Mr. A. J. Makins—General Manager, Commercial Union Assurance Co., Ltd. Member of F.O.C.

Air Commodore G. Powell—Managing Director, British Aviation Services, Ltd.

Mr. A. S. Pratten, O.B.E., G.M.—Chief Officer, London Salvage Corps.

Sir William Stanier, F.R.S., M.I.Mech.E.—Scientific Adviser, Ministry of Supply. Lately Scientific Adviser, Ministry of Production, and Chief Mechanical Engineer, L.M.S. Railway.

Professor D. T. A. Townend, D.Sc., F.R.I.C.—Director, British Coal Utilisation Research Association. Lately Professor of Coal Gas and Fuel Industries, Leeds University.

Mr. W. H. Tuckey, O.B.E.—Director of the Fire Offices' Committee Fire Protection Association.

The Fire Protection Association

The purpose of the Fire Protection Association is best expressed by the phrase "on how best to reduce fire wastage." To-day, when factories are producing goods for export, it is obvious that we cannot afford building fires in industrial and commercial premises; they are, in fact, national disasters.

The Fire Offices' Committee Fire Protection Association has two classes of membership, Ordinary Members, who are all members of the F.O.C., and Associate Members who are industrial and commercial firms, local authorities and other bodies. The former are mainly responsible for the cost of the Association and the latter pay a nominal subscription but are entitled to the same services as Ordinary Members. The Association is in many respects parallel in scope and purpose with the National Fire Protection Association of the United States. The first chairman of the Association is Sir Arthur Morgan and the director is Mr. W. H. Tuckey, O.B.E., who has for many years been the Chief Technical Officer of the F.O.C. and is one of the acknowledged experts of the world on fire protection. The temporary offices of the Association are at the Fire Testing Station, Elstree, Herts.

The Fire Grading Committee

In 1942 the Joint Committee of the Building Research Station and the Fire Offices' Committee on the Fire Grading of Buildings was reconstituted after having a short life of a few months in 1939. The Committee was appointed to "Assign suitable precautions to buildings in order to ensure an adequate standard of safety in relation to their fire hazard." The first Report of the Committee has been published by the Ministry of Works as *Post-War Building Study No. 20 Fire Grading of Buildings, Part I.—General Principles and Structural Precautions.* Future parts will deal with Fire-Fighting Equipment, Means of Escape and Chimneys and Flues. A full review of the Report will be published in "Book Reviews" in the near future.

THE INFLUENCE OF DAYLIGHT AND SUNLIGHT ON FUNCTIONAL DESIGN OF SCHOOL BUILDINGS

By JOHN SWARBRICK, F.S.A. [F.]

A PAPER READ BEFORE THE COUNTY ARCHITECTS' SOCIETY AT THE R.I.B.A. ON THURSDAY, 5 DECEMBER, 1946

MR. C. G. STILLMAN [V-P] in the Chair

A well-known authority recently wrote : " The healing effects of the various forms of light are now recognised to be of the highest importance, and sunlight in particular is, in many morbid conditions, more curative than all the resources of the pharmacopœa. It is one of the most potent weapons in the physician's armamentarium."

In this country, direct sunlight may produce at midsummer an illumination of as much as 10,000 foot candles on the printed page of a book, out of doors. This, it has been suggested, might produce eye strain, in the case of young school children. Regarding this matter, I have obtained the opinion of Prof. Hamilton Hartridge. The Professor wrote : " I know that the illumination out of doors can reach high values, but few of us suffer discomfort, and none of us suffers harm therefrom, unless we are foolish enough to allow the sun's rays to strike directly into our eyes. I would not have thought that any harm would have resulted from light which came off a page, provided that it was not so bright as to cause the eyes to water. As you know, the retina is protected to a large extent by the pupil, which contracts to a small aperture in sunlight." During the many years I have lived in the north of England, I have never experienced any serious discomfort from such bright sunshine as I have been privileged to enjoy, in the summer months. In the South of England, sunnier conditions prevail and precautions may be desirable here that would not be necessary in the North. In Switzerland, external sunblinds have been provided for classroom windows. Although light can unquestionably be harmful in tropical and sub-tropical regions, it is rarely that it can be regarded in the temperate zones as other than beneficial. During midsummer, I have seen awnings stretched across streets in Seville, but that was mainly as a protection from heat and not from light. The effects of solar heat and light should be regarded as distinct. At the latitude of London, solar rays are usually too subdued to exercise any harmful effect, and we normally experience only their beneficial properties ; but it has to be remembered that, in tropical and sub-tropical regions, undue exposure to them may produce serious results. In order to ascertain the extent to which sunlight may be enjoyed, in any particular building, it is necessary to know the location of the sun at all hours of the day and at all times of the year for the latitude in question. This data has been recorded for convenience on my drawings known as " Solar Location Diagrams."

In order to enjoy direct sunlight, it is essential that the windows should be correctly orientated and that they should be of suitable dimensions. It is also vitally important that they should not be obstructed externally by surrounding buildings.

Recent research has done much to confirm the policy of the authorities in demanding the provision of access for sunlight in houses, flats, hospitals and schools ; but our consciousness of the value of solar rays is by no means of recent discovery. Their properties have been recognised from the earliest times.

Special Light

In this country it is only possible to protect daylight so far as it is required for the usual purposes of occupation or habitancy. The English law of light does not protect " special light " by prescription. By " special light," reference is made to light in excess of normal requirements for occupation, such as those a watchmaker or diamond cutter might need. Even with this limitation, it has been the means of enabling people to live and work under healthy conditions. The full extent of the blessings enjoyed is best realised by comparison with the conditions under which the less favoured income groups are obliged to live and work in countries in which daylight is not protected by prescription. For such comparison, no more suitable instances can well be selected than those we find in some of the larger cities of the United States, and, of these, New York City and Chicago probably afford some of the most striking examples.

Reflected Light

Light reflected from external walls and buildings is not by any means an adequate substitute for daylight, but it cannot be ignored nevertheless. Its value obviously depends upon the reflective capacity of the surface, upon which direct light falls and the angle at which the rays impinge. If the reflecting wall is dirty or black, its value as a reflector is practically negligible. Much is to be said in favour of " Revalement," that is the decennial cleansing and repainting of buildings enforced in Paris. If similar powers were exercised in the County of London, the interiors of countless buildings would be much better lighted than they are. For the enjoyment of reflected daylight, there is apparently no legal protection in this country, as no powers can be exercised under English law to control the colour or reflective capacity of the exteriors of buildings. A light coloured wall may be painted black, without any compensation being payable to neighbouring owners, who are deprived of light in consequence. A chart has been compiled by me to simplify the determination of daylight factors in respect of the luminosity of externally reflecting surfaces, for various coefficients of reflection.

Sunlight

In dwelling houses, hospitals, schools and certain other types of buildings for human occupation, sunlight may be regarded as an essential amenity, that cannot be dispensed with and for which there is no artificial substitute. When, however, we come to consider the design of offices, factories and workshops, the practical difficulties of ensuring satisfactory orientation and adequate internal insolation cannot be ignored. Sunlight, being regarded for purely legal purposes as " special light," there is no statutory protection for it in this country : adequate daylight, which may come from a sunless aspect, is regarded as sufficient. The Factory Act, although insisting upon adequate natural illumination does not regard sunlight as a *sine qua non*. Moreover, for certain operations, such as comparing colours, the qualities of textiles and a variety of other kinds of work, sunlight is regarded as a decided disadvantage. It may therefore be that, despite all its health-giving properties, direct sunlight may have to be regarded rather as a luxury than as a necessity in business and industrial premises. On the other hand, daylight cannot be dispensed with, as no adequate substitute for it has yet been found.

In my view, the position of the sun, at various hours of the day and at different times of the year, should be studied much more carefully in relation to aspect than it has hitherto been. Architects frequently state, almost dogmatically, what they believe the effect of a window with a certain aspect should be, without any investigation and without, in fact, knowing what the angles of altitude and azimuth would be at certain hours of the day, during midsummer, midwinter and the equinoxes. In consequence, such predictions are very often wrong. Frequently the sun cannot penetrate in the middle of the day to the extent assumed. The effect of neighbouring obstructions is not uncommonly much more serious than has been assumed. Most serious of all, windows are sometimes not designed so as to make adequate insolation possible.

The best way to deal with the problem of insolation is to plot either at table or floor level the area, on which the sun would shine at various hours of the day, at some selected time of the year. This might be done for intervals of one hour

throughout the day selected. In this way, the areas receiving sunlight throughout each day can be compared and the insolation areas scientifically defined. Similarly, the shadows cast by buildings may be plotted and new buildings may be placed so as to avoid unnecessary loss of sunlight, owing to the shadows of surrounding structures. The necessary data will be found on one of the many Solar Location Diagrams I have had plotted for various parts of the world. The apparent solar paths on some of these have been determined by H.M. Nautical Almanac Office, at the suggestion of the Astronomer Royal.

The Ministry of Education recommend a south-eastern aspect for school classroom windows, but I think it would be found that a slightly modified aspect would probably serve the purpose more efficiently. This is a matter that should repay further investigation.

Daylight

It is interesting to observe how little material progress was made, in connection with the investigation of natural lighting conditions, prior to the time when Mr. A. P. Trotter devised a portable photometer. From that stage, careful investigations were made. Improved photometers of various kinds were subsequently manufactured, including the Macbeth "Illuminometer," the Holophane "Lumeter," the Benjamin "Lightmeter," etc. Much of the work done at the National Physical Laboratory at Teddington, in compiling daily records of natural illumination was accomplished by means of a "Macbeth "Illuminometer." I used a Holophane Lumeter" and became keenly interested.

With the help of photometers, it was soon discovered that an illumination of 500 foot candles from the entire dome of the sky was received on average dull, sunless days during late autumn, the winter months and early spring. During the summer months, even when all sunlight was excluded, the illumination received on an unobstructed roof from the entire dome of the sky was usually, at midday, well over 2,500 foot candles. In fact, an illumination of about 2,750 foot candles was sometimes recorded, without any sunshine whatever. The illumination due to direct sunlight alone, measured on the horizontal plane has amounted to about 8,500 foot candles at midsummer and to about 1,000 foot candles at midwinter. Measured normally, the direct sunshine alone varied, roughly speaking, from 10,000 at midsummer to 2,000 foot candles at midwinter.

With the help of photometers, it was soon observed that, throughout the day, there were quick fluctuations of luminous intensity, at any given point inside a room. This was particularly noticeable on days with a blue sky, when cumulus clouds passed in quick succession over the sun. In consequence of these observations, it became clear that the best course would be to proceed as Mr. Trotter advised in 1895, by recording intensities as percentages of the light enjoyed externally, on the top of an unobstructed roof. Such a percentage was known at first as a "roof ratio," but now the terms "sky factor" or "direct daylight factor" are preferred, when the natural illumination received at a selected point internally is limited to light coming directly from the sky without reflection of any kind. When the natural illumination received internally includes both direct rays from the sky and rays reflected from all sources, the percentage is termed the "indirect daylight factor." It might also be described as the photometric daylight factor, as it is the only one that can be measured by means of a photometer. The sky factor or direct daylight factor cannot be measured by means of a photometer, as it is not possible to prevent reflected rays of light from affecting such instruments. Both the sky factors and the indirect daylight factors are constant, inasmuch as the percentages in each case remain the same, however much the intensity of the external illumination may increase or decrease, so long as the physical conditions are not changed. If the illumination received on the horizontal plane, above an unobstructed roof is 1,000 foot candles and the reading at a given point on a table, inside a building, is 10 foot candles, the indirect daylight factor is 1 per cent. If later on in the day, the roof illumination should fall to 500 foot candles, the reading at the given point inside the building would be found to be 5 foot candles, still 1 per cent. of the illumination on the roof.

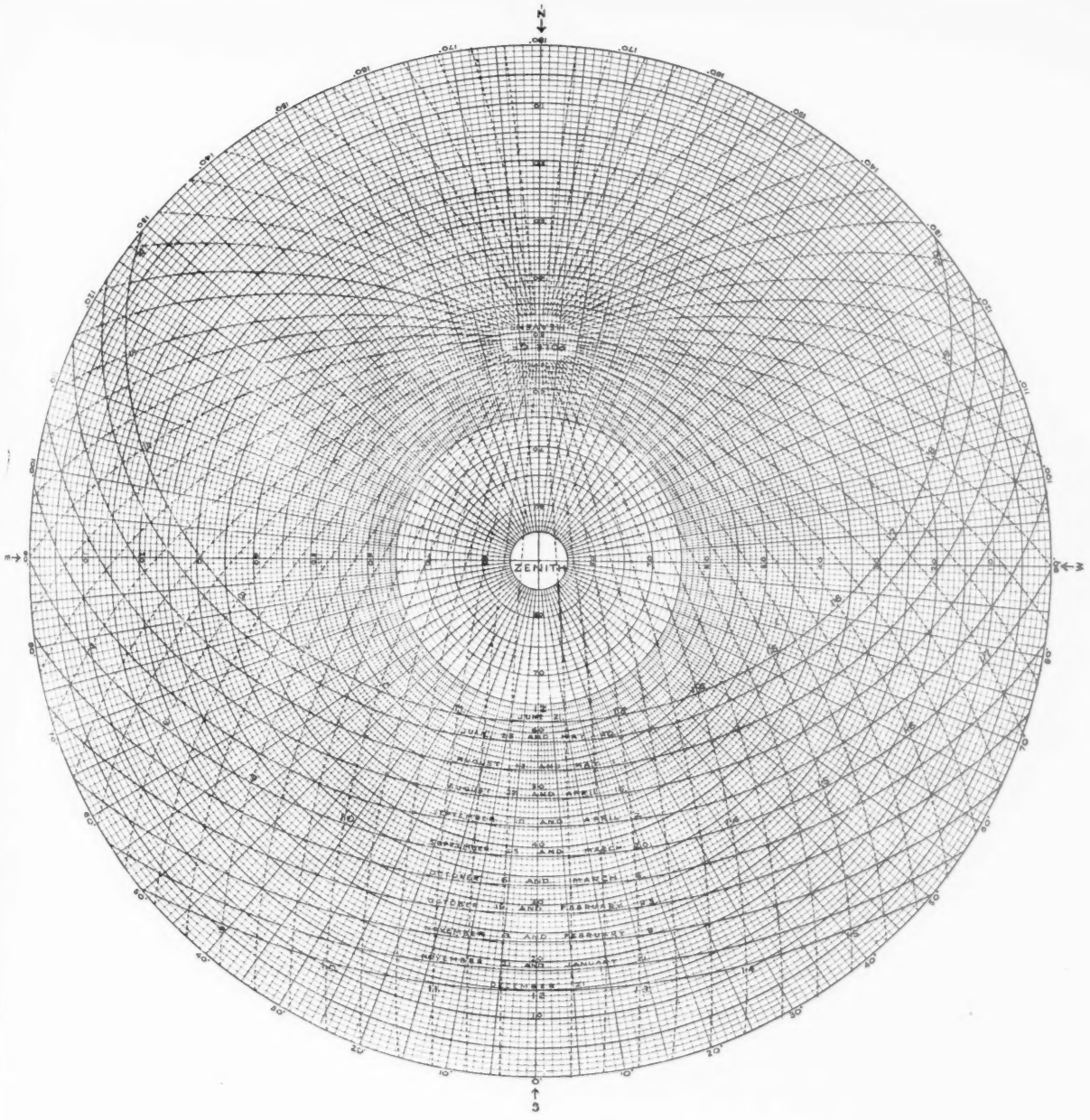
In theory, it may appear simple to make a daylight plan or contoured illumination survey by obtaining a reading of the illumination on an unobstructed roof and plotting the contours internally, by simply finding the positions on the horizontal plane, at table level at which the reading representing the desired indirect daylight factor can be found. In practice this method does not work out quite as easily as may be imagined. In the first place it would probably be discovered that all the time the work was in progress, the external light had been both increasing and decreasing in intensity with surprising rapidity. Such variations may be very appreciable, without being detected, as the eye is not a reliable photometer. To avoid this risk, two photometers of the same pattern might be used simultaneously, one on the roof and the other indoors; but it would be necessary for the photometers to be calibrated in the same way and for the readings to be identical, under the same lighting conditions. In addition, it would be necessary for there to be some signalling arrangement, so that the observer on the roof might take his reading at the precise moment when the corresponding internal reading was being taken. A mistake in signalling or booking might lead to a serious error being made. Even if plotted correctly, such a daylight plan would have limited value, as it would take into account reflected light from the floor, furniture, decorations, external structures and the outside pavement, which reflects daylight on to the ceiling. As the decorations might change considerably every few years, the amount of reflected light received would be almost certain to vary. Consequently, the contours for light decorations would be found to vary from those when the treatment is darker. Indirect daylight factors are not a satisfactory means of measuring the sources of natural light in interiors. Sky factors, which make no allowance for reflected light, alone afford satisfactory standards of measurement and comparison. The sky factor cannot be determined by the use of photometers, as explained, being based solely on the amount of sky that is not obstructed, when seen from the selected point. As a result, a sky factor is a geometrical function that can only be determined by calculation or instrumental methods of an entirely different kind from those possible with photometers. In its determination, the illumination intensity of solid angles of light, at certain angles of altitude, has to be assessed, in accordance with the Cosine Law of Light.

The sky factor being unaffected by reflected light and variations in intensity of illumination is constant and is consequently the most useful standard of illumination for general purposes. The natural illumination of a room should be adequate, quite apart from temporary colour schemes and light temporarily received from external structures, the pavement of the street, etc. It is best to consider the lighting of a room as it would be if the walls, floor and ceiling, external structures, and the pavement, were jet black and quite unable to contribute anything by reflection. It has sometimes been suggested that daylight factors should make allowance for the amount of light lost in transmission through glass. In practice, it makes comparatively little difference, whether such loss is taken into consideration or ignored, so long as the angles of the rays come within a cone with a radius of 40 degrees at the base, of which the central visual ray forms the axis, in the case of vertical windows viewed horizontally. Within such a cone, the loss is less than 10 per cent. There is, of course, no special reason why we should not regard daylight as an amenity that may be enjoyed through open windows, even though, as we all know, the windows have to be closed in the winter and colder months.

The Natural Illumination of School Classrooms

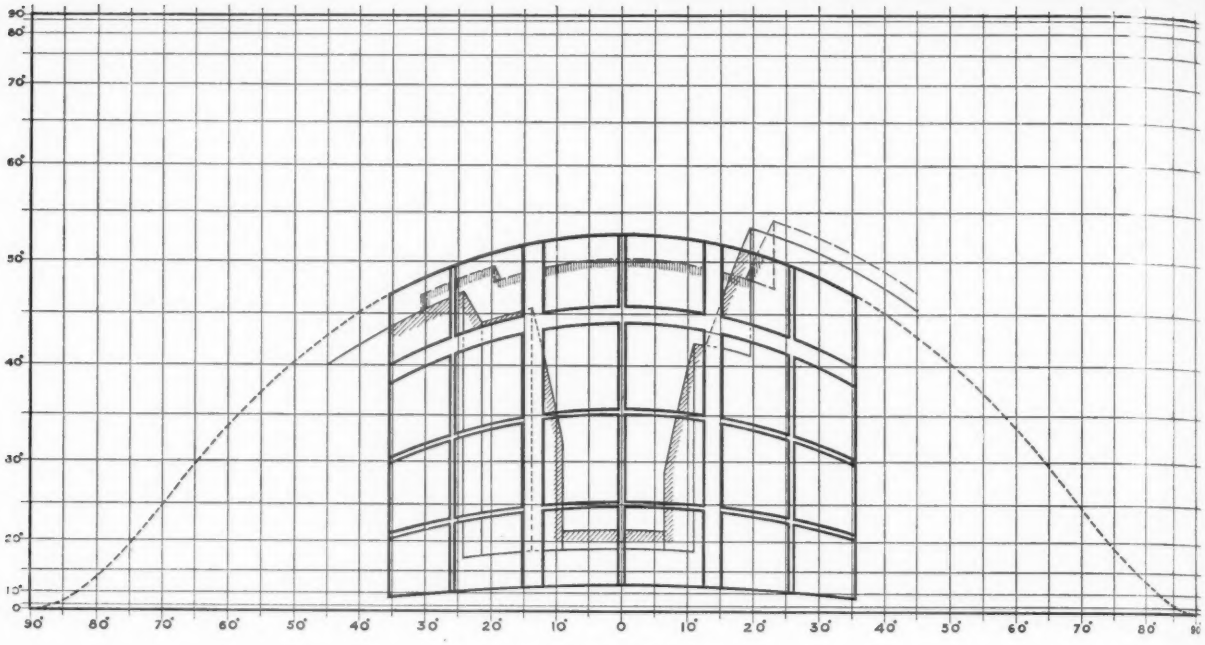
In the "Regulations prescribing Standards for School premises, 1945," the requirements in respect of daylight are given in section 39, sub-section (1) and read as follows:—

"At each desk or place of work in every teaching room in every School or Department the daylight factor shall not be less than 2 per cent."



SWARBRICK SOLAR LOCATION CHART

This solar diagram indicates the apparent solar paths for the latitude of London (51° 30′ North) at various times of the year. It also records Apparent Solar Time by inches, at intervals of 20 minutes throughout the day. The differences between Apparent Solar Time and Greenwich Mean Time may be ascertained, if occasion should arise. It should be noted that the polar diagram is a celestial projection, looking upwards, and not a terrestial one, looking downwards. In order to plot shadows and insolation areas on plan, it is desirable to use the reversed terrestial projection, in which the East is on the right-hand side of the chart and not on the left, as in this case. When a terrestial projection has been placed in correct relation to the plan of a building, a line drawn to the Zenith, from the intersection of the selected hour circle and the apparent solar path at the time of the year under consideration, defines in plan the vertical plane through which the solar rays pass at the time. The angle of altitude of the sun at the time, is indicated on the radial grille. The data recorded on this Chart was compiled by Mr. A. C. Stevenson, M.Sc., F.R.A.S., of University College, London.



WALDRAM CALCULATING DIAGRAM

This chart represents the familiar calculating diagram, devised and first published in 1923, by Mr. P. J. Waldram, F.S.I. [L.], and his son, Mr. J. M. Waldram, B.Sc., for estimating the percentage of daylight received within a room directly from one-half of the dome of the sky, on the horizontal plane of a table, and shows an imaginary window and external obstructions. Existing obstructions are indicated by inclined hatching and a proposed new building by vertical edging. This chart and all others devised on the same principle are necessarily graphic representations of the operation of Lambert's Cosine Law of Light. In this case, a rectangular diagram was adopted. Horizontal lines, when plotted on this diagram produce the kind of bow-shaped contours illustrated. The sky factor is determined by measuring the area of sky ultimately unobscured and by calculating the percentage it represents of twice the area of the entire diagram. The percentage of the diagram illustrated would only be the sill ratio or proportion of the light received directly on the horizontal top of an unobstructed window sill. The sky factor being the percentage received from the entire dome of the sky is half that figure. This method of determination is possible because equal areas represent equal luminosity on the horizontal plane. To measure irregular sky patches accurately it is usually desirable to use a planimeter.

In the "Memorandum on the Building Regulations," published in 1945, further particulars are given in section 28, subsection (1). These are as follows :—

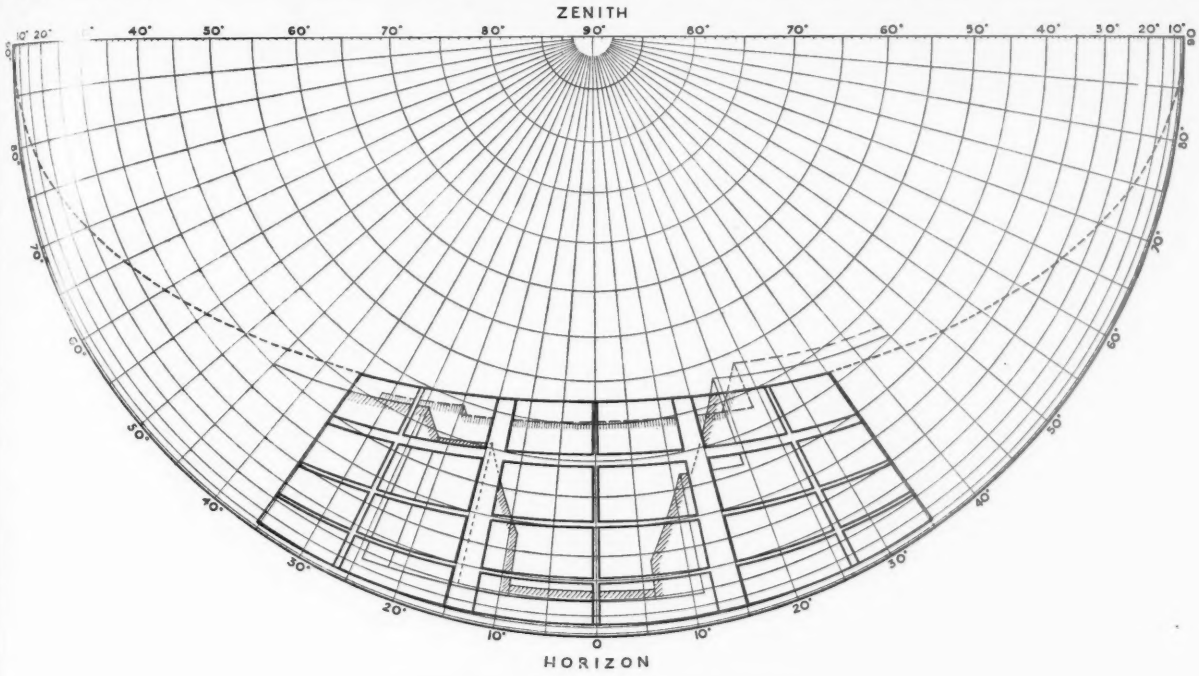
"The 2 per cent. daylight factor prescribed in the Regulations for teaching rooms is the minimum, and a higher figure of up to 5 per cent. should, if possible, be secured, *e.g.*, in rooms where clerestory lighting or top lighting can be arranged."

During an average cloudy day in the winter months, the illumination from the entire dome of the sky normally amounts, as explained, to little more than 500 foot candles. Two per cent. of this is obviously 10 foot candles and 5 per cent. is 25 foot candles. It has been suggested that this illumination is excessive and might even be harmful.

In 1926, a report of the Medical Research Council and the Department of Scientific and Industrial Research, entitled "The Relation between Illumination and efficiency in fine work (type-setting by hand)," was published by H.M. Stationery Office. In the Conclusion the following passages occur :—

> "The data presented here point very definitely to the existence of an optimum value of illumination for hand composing, which is in the order of 20 foot candles" . . .
>
> "If the illumination is less than 2 foot candles, nearly one-quarter of the possible output is lost, while the number of mistakes is more than doubled, and the fatigue experienced by the compositors is materially increased. Even when the illumination is as much as 7 foot candles—a value which is probably higher than the present general practice—over 10 per cent. of the possible output is lost and there is an unnecessarily high percentage of errors."

If that was the case with experienced adults, the consequences in the case of school children would presumably be more serious. The total external illumination in the summer months might, as I have stated, occasionally rise to about 2,750 foot candles, without sunlight, and the 2 per cent. daylight factor, on such occasions, would mean an internal illumination of 55 foot candles on the classroom desks, whilst the 5 per cent. daylight factor would produce 137½ foot candles. These, however, are not illuminations that would cause any inconvenience and would certainly not be harmful. Every year children bask in the sunshine and read story books in it, when the luminosity amounts to anything from 2,000 to 10,000 foot candles and I have never known anyone to suggest that they were injuring their eyesight. According to Prof. Hamilton Hartridge, so long as the eyes do not water, no harm can be done. My own view is that, in the temperate zones, the more exposure to the sun's rays the children receive the better they will be physically and mentally. Light of the kind that we can enjoy in this country is, I believe, certain to increase the efficiency of both young and old, provided that the light is not accompanied by undue heat. Eye-strain is due not so much to high illumination as to the close juxta-position of bright light and darkness. This effect is commonly referred to as "glare." We all know that, in broad daylight, we may fail to notice that the headlights of a motor car are turned on. The light from them certainly does not cause any discomfort, because, owing to the brightness of the light generally, the pupils of our eyes have contracted. During the hours of darkness, the same headlights would dazzle and almost blind us, because the darkness would have caused the pupils to become



SWARBRICK RADIAL CALCULATING SHEET

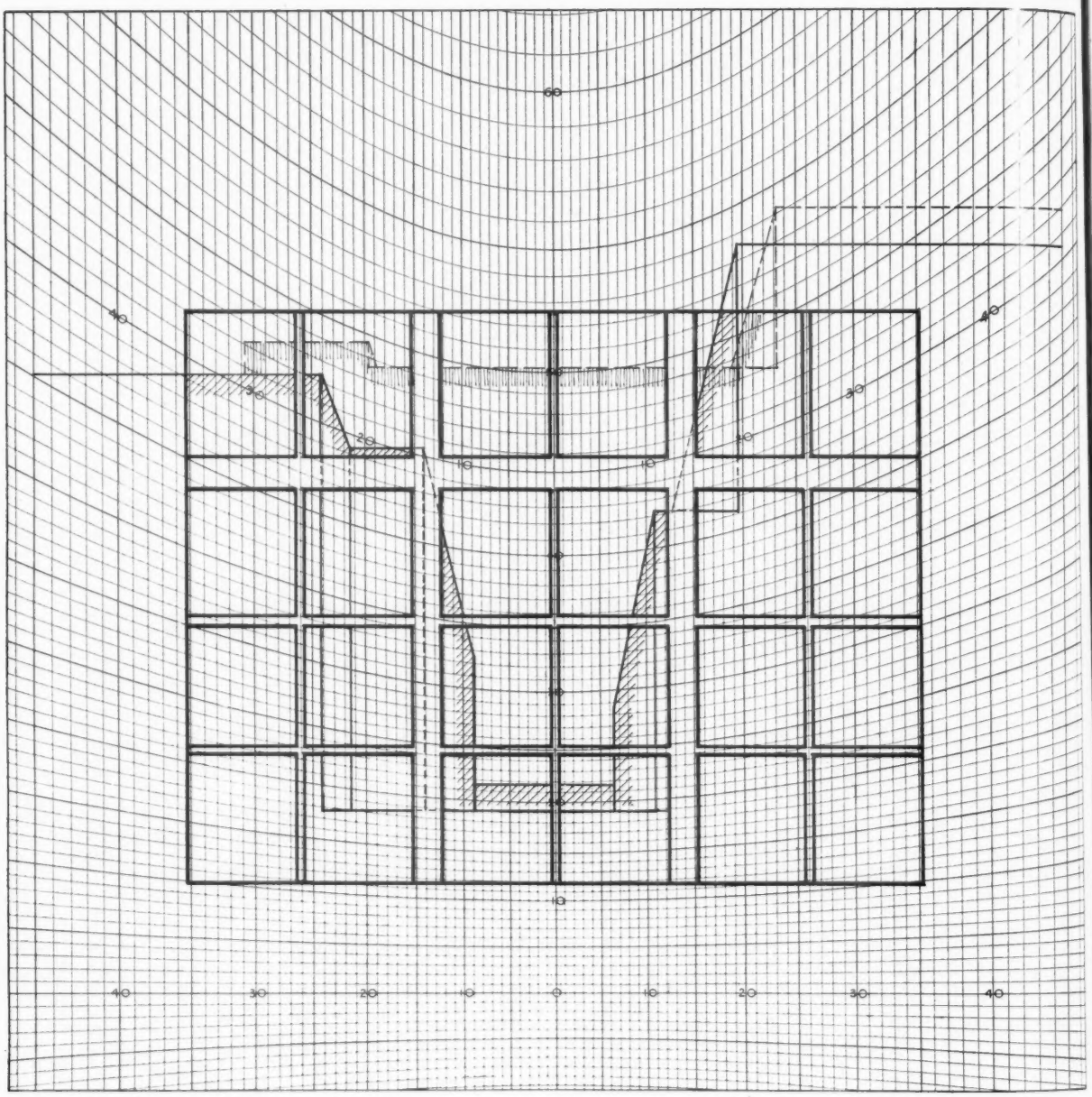
This is a graphic representation of the operation of Lambert's Cosine Law of Light in semi-circular form and is used like the Waldram calculating diagram for determining both the Sky Factor and the Sill Ratio. In considering the natural illumination of a room with windows on opposite sides or with top lights, it is better to use the circular form of this chart. This sheet indicates the same conditions of obstruction as in the case of the rectangular calculating diagram. Horizontal lines plotted on this chart, however, produce elliptical forms and thereby reduce labour and provide an additional check on accuracy, as the determination of one point near the minor axis of an ellipse and the direction of the major axis makes it possible to define the rest of the line, without plotting further projections. The axis of all such ellipses pass through the centre of the circle or semi-circle of the diagram selected, as the case may be. In other respects, procedure is similar to that in the rectangular counterpart, but it must be remembered that, in calculating the Sky Factor when using the circular type of diagram and not the semi-circular the percentage is a proportion of the area of the entire circle. As in the case of the rectangular chart, it is usually desirable to use a planimeter to measure irregular sky patches accurately. The radial charts were first published in 1929.

distended. So long as there is no bright light, we can see much in a poor light, but the moment the headlights shine into our eyes, we feel the effect of glare and the only things we can then see are the blinding headlights. The avoidance of darkness, in the vicinity of bright light, is similarly important in classrooms. In other words, the general light should be good and not only that on the desks. Although the Ministry of Education do not stress this point, it may, I assume, be implied. Sunshine falling on a desk or blackboard may at times produce a slight sense of glare and discomfort. Consequently, classrooms should be designed so as to make such contrasts either impossible or infrequent. Before the war, sunblinds were used here, as in Switzerland, for this purpose, but unfortunately their cost is now almost prohibitive.

The direction from which daylight passes to the desks and blackboard is an important matter. Light from opposite directions should be avoided, if it is possible to do so. This is particularly troublesome, if the light comes from a low altitude, when the shadow of the hand, when writing, produces two shadows, the stronger light producing a stronger shadow. Books and other objects can produce the same effect on a desk. Supplementary light from any source is better than insufficiency, but it may be an embarrassment. If supplementary light is essential, then the best course is, if possible, to arrange for it to come down vertically from the ceiling and so cause shadows that fall downwards and do not extend laterally. In fact, in the case of one storey classrooms, it is as well to remember that better supplementary daylighting can be obtained from the zenith than from any other direction. Such lighting has been extensively used for teaching rooms in the United States of America and it seems remarkable that the possibilities of classroom lighting in this way have not been fully explored here. The only examples that I have seen of the use of such top lighting in school buildings here have not been entirely satisfactory, so far as I can recollect; yet I have myself used domical top-lights with easily cleansible lay-lights in other buildings and they have proved efficient. Mr. Stillman has already suggested the provision of transverse top-lights over one-storey classrooms and a model, with longitudinal top-lights, designed by Mr. Denis Clarke Hall, may now be seen at the "Britain Can Make It" Exhibition.

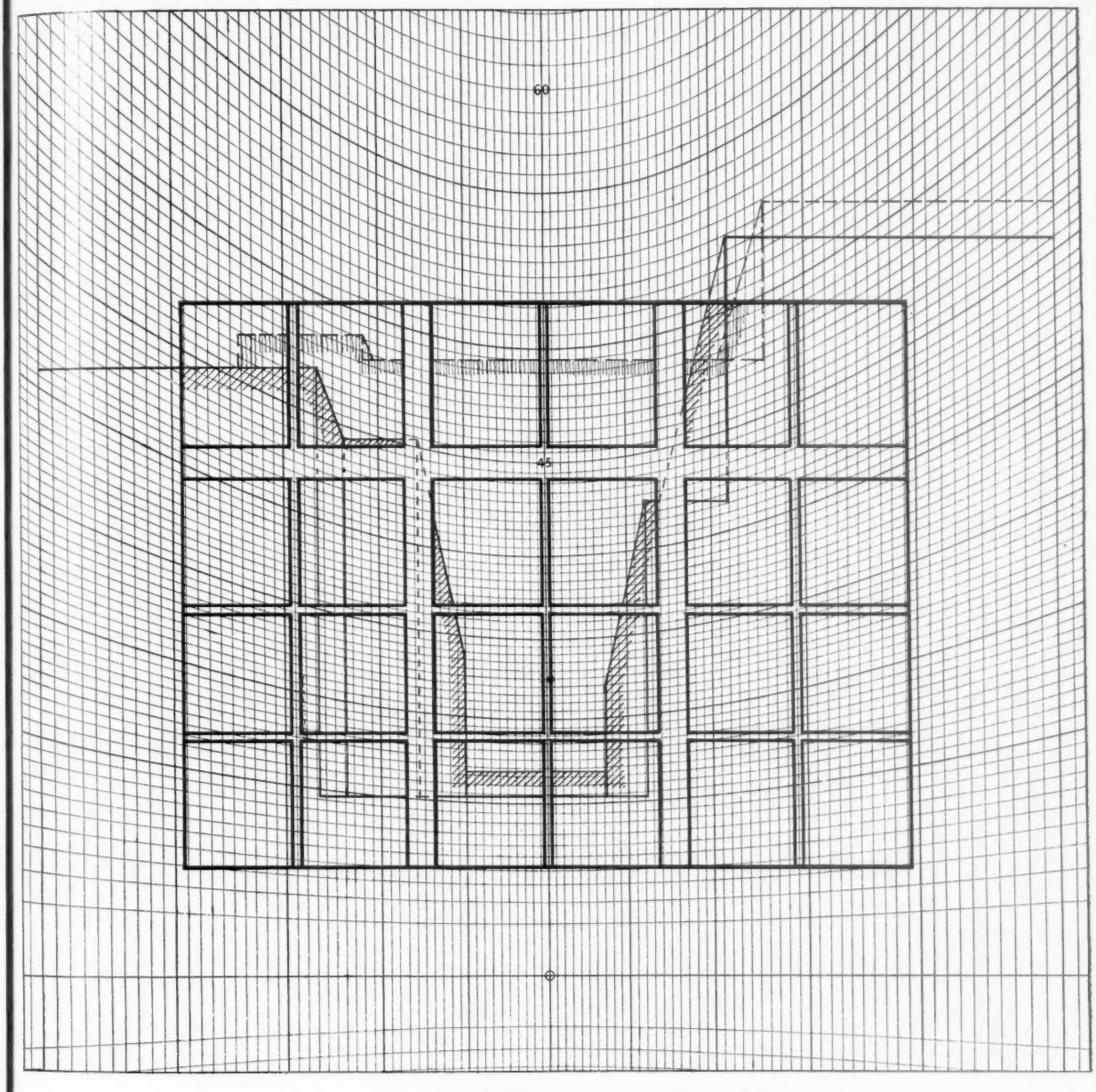
Experimental Classroom

If the County Architects' Society and the R.I.B.A. School Design and Construction Committee could arrange for an experimental classroom to be erected by a Government department for the purpose of solving the daylight problem, they would be rendering a valuable service. It is understood that the experimental school building at Lea, near Preston, in Lancashire, is being used by the Ministry of Works, solely for the purpose of testing the possibilities of certain materials and methods of construction and that those in charge are not interested specially in daylighting problems. As daylighting is a special study in itself, it would probably be best for lighting experiments to be made independently in such a way as to prevent useful investi-



SWARBRICK PERSPECTIVE CHART

This is a projection on to a vertical plane of the spherical co-ordinate system, registered by the altitude and azimuth circles, extending over the domical hemisphere of the sky. It was first published in 1930. Objects plotted upon such charts, by means of angular measurements, produce a graphic representation of the image in correct perspective. In consequence, errors in plotting can be quickly detected. If parallel lines do not vanish to the same vanishing point or if the prospect does not agree with a photograph, taken from the same point of observation, some mistake must have been made. The window and obstructions to light illustrated are exactly the same as those represented in the two previous illustrations. To determine the Sky Factor, either a Daylight Factor grille, indicating units of equal luminosity, on transparent paper has to be superimposed or else the graphic projection of the objects should be transferred to a suitable Daylight Factor grille, on opaque paper.



SWARBRICK DAYLIGHT FACTOR GRILLE

In order to produce this diagram, the entire dome of a hypothetical, uniformly illuminated sky was sub-divided into 40,000 parts, each representing a unit of equal luminosity on the horizontal plane 0·0025 per cent. Daylight Factor. When this had been completed, a projection on to a vertical plane was made, so as to correlate the illumination units correctly with the Perspective Chart. In order to determine the Sky Factor, in this case, a planimeter is not required, as it is only necessary to count the number of whole units of illumination or parts of units in the area of unobstructed sky and to multiply the total by 0·0025 per cent. By proceeding in this way, the most complicated conditions can be dealt with accurately and the entire operation can be made intelligible to the uninitiated. The distortions that occur, when measuring diagrams are used, are avoided. Moreover, when the contemplated conditions exist, the operation may be performed photographically, by means of the Swarbrick Photo-theodolite, in a matter of seconds, without the intervention of draughtsmen, who are sometimes not incapable of error. This is often most important, as the time frequently spent in collecting data regarding neighbouring structures, to enable draughtsmen to plot skylines correctly by geometry has been most protracted and almost incredible. The calculations required for the preparation of this grille were made by Mr. A. C. Stevenson, M.Sc., F.R.A.S., of University College, London.

gations of this kind from being hindered or interfered with by the consideration of structural problems, that are not more important and which can be considered, with mutual advantage, elsewhere. The structural investigators and those interested in daylight and artificial light might confer occasionally, in order to keep in line.

If such an experimental classroom can be provided for daylighting research, I should like a Committee to consider, together with other suggestions, a type of classroom that I illustrate in one of my diagrams. It shows a primary school classroom that measures 22 feet 6 inches alongside the window wall and 27 feet wide, and has an area of 607.5 sq. feet. Around the desks, alongside the walls, there is a clear gangway 2 ft. 6 ins. wide to enable the pupils to examine exhibits on the walls and on the window bottom. The gangway serves two other purposes. It prevents pupils from having to sit too close to heating radiators and too close to the draughts and cold air currents that come from all windows during the colder months of the year, and it enables the master to get access to the children on the back rows almost as easily as to those on the front rows. This classroom is only intended to provide accommodation for thirty pupils at single desks.

As this type of classroom is to be lighted by top-lights, it is not necessary to make the rooms 11 feet high, as at present. A height of 9 feet would be sufficient for ventilation purposes and would permit of cross ventilation, over the entrance corridor, through openings that should not admit daylight. There would be no advantage in making classrooms of this kind any higher than may be essential, as the nearer the top lights are to the working plane, the better the lighting on that plane would be. With suitable domical or other top-lights, an illumination of 5 per cent. daylight factor can easily be obtained. In such a classroom, the cubic content would be 5,467.5 cubic feet as against 5,808 cubic feet in the standard Primary School classroom for 40 pupils.

Architects being naturally desirous of obtaining a satisfactory æsthetic effect may think that a purely functional solution of the teaching unit problem on these lines may not afford them the kind of opportunity they require. In this desire, all architects naturally have our fullest sympathy. Apparently, a departure from the old traditional lines of treatment would be necessary; but, in these days of transition, that is exactly what we must expect. Without conforming to functional requirements, no real permanent progress can be made.

DISCUSSION

Mr. Marshal (Hertfordshire) said he was in some doubt with regard to the amount of sunlight which should be allowed to enter a classroom directly. There would appear to be two opposing requirements. The first was that as much sunlight as possible should be let in, and the other was, if a lot of sunlight were let in and children were effectively to read or write, they might suffer from glare through reflected light on the paper.

Mr. Swarbrick, in reply, said that, when he had been talking about enjoying sunlight and the effect of sunlight upon the health of children, he had not meant that rays of the sun should pour into classrooms as in an open-air school. For the purpose of open-air classes, certain hours of the day were selected. Then children were taken out to enjoy studies in the open air and sunshine. Even that, however, had to be done with discrimination.

With regard to the effect of glare, he was not aware that children suffered any serious consequences by reading in the brightest light of midsummer in well-lighted surroundings. To be in a dark classroom, with a very bright beam of sunlight on the desk would, of course, be harmful to the eyes, but the Ministry of Education must be aware of that fact and would not approve of such an arrangement.

Mr. Marshal (Hertfordshire) asked whether it would be considered harmful to allow sunlight to pour into a classroom by having, say, one side of the room entirely of glass. Of course, if the room happened to be decorated in gay colours, it would be very bright indeed, and he would be interested to know if that would be harmful to the children.

Mr. Swarbrick, in reply, said he did not consider that sunlight, enjoyed in a well illuminated classroom in this country, would be harmful. He had been told by school-teachers that they did not like teaching in rooms that were entirely sunless. They did like sunshine some time during some part of the day, preferably in the morning. In the afternoon the children were not there for any great length of time. School Medical officers considered that it was essential, in order to keep children healthy and cheerful to subject them to a certain amount of exposure to sunlight during part of each day, when conditions permitted. As to the amount of insolation desirable, that, of course, was a matter for argument. Recommendations had been made in the Code of Practice on Sunlight. The admission of sunlight into classrooms was, he considered, very important. He had been in numbers of classrooms in which there had been no sunlight, and the teachers had deplored the loss. The degree of exposure to sunlight should be a matter for careful investigation.

Mr. A. C. Bunch (Leamington) said the experience of most architects who had designed classrooms with large windows was that, when the work had been completed, all the teachers asked for sunblinds. The author agreed that during a few hours of days at midsummer, sunblinds were a convenience, but he considered that, during the greater part of the year, they were unnecessary.

Mr. Connelly asked whether or not he was mistaken in understanding that Mr. Swarbrick did not approve of vertical clerestory lights in classrooms on the opposite side of the room to the main windows. Should there just be a solid wall opposite the windows and should one rely on domical or other ceiling lights?

Mr. Swarbrick, in reply, said that supplementary light had a value but, at the same time, it might be an embarrassment. He felt that light from the zenith would not be an embarrassment to the same extent as lateral light, from two opposite directions, coming from a low angle of altitude, which would cause two shadows to be formed by a pupil's hand or by books on the desk.

Mr. Horsfall said he understood the author to say that the south-east aspect was bad. If that were the case, he would be interested to know what Mr. Swarbrick did consider to be the ideal aspect.

Mr. Swarbrick said he was sorry if he had not made it perfectly clear that he did not regard a south-eastern aspect as a bad one. On the other hand, he regarded it as a good one. He was not, however, satisfied that a slightly modified aspect would not be more advantageous. This was a subject for investigation, with the help of Solar Location diagrams. He thought that it probably would be found that a slight change of aspect would prove more efficient, but he added that he had not yet carried his investigations far enough to enable him to form a definite opinion.

Mr. Bowman said that the orientation of classrooms and schools was in some degree relative to things like Summertime and Double Summertime. One might orientate very carefully and then find that some high authority had decided to vary the time.

Mr. Swarbrick said that decisions like that did, of course, upset orientation, if allowance were not made for the deviation from Solar time. When he had alluded to hours of sunlight, he had referred to Solar time in all cases.

Mr. Irwine (Derby) asked whether he had understood Mr. Swarbrick to say that a domical light of three feet diameter in a classroom would give five per cent. Daylight factor.

Mr. Swarbrick said that, so far as he could recollect, a domical light three feet in diameter, 6 feet 6 inches from the working plane or desk, would give an illumination of about five per cent. daylight factor. This, he added, would be at a point immediately below the toplight. There would, of course, be light coming, in addition, from other domical toplights and the cumulative effect would have to be considered.

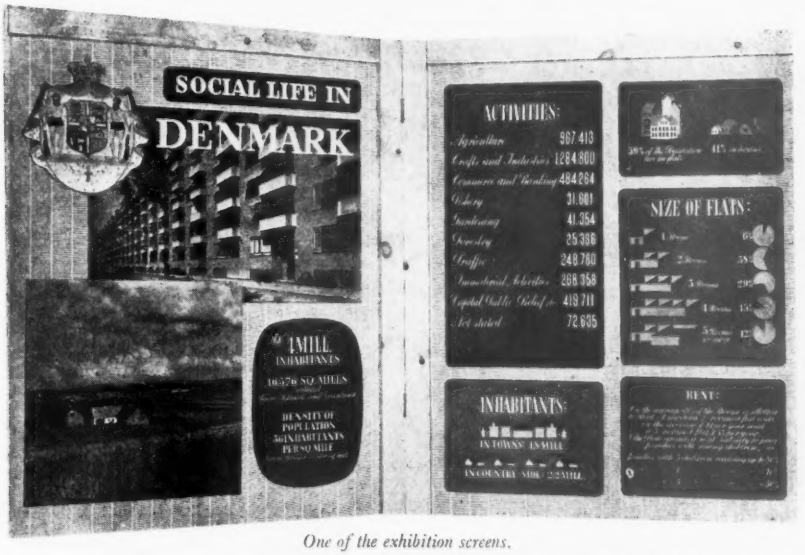
Mr. Wilson (Middlesex) asked what variation in daylight would constitute glare in any one room. Taking the normal classroom, he asked, if a daylight factor of 20 per cent. by the windows and 5 per cent. by the adjacent wall would produce an effect of glare.

Mr. Swarbrick said he would be reluctant to express any opinion at all regarding glare, without investigation. The eyes were delicate pieces of mechanism and they were not all equally efficient. Few people saw things in precisely the same way. What might produce an effect of glare to one might not to another. Consequently, in such cases, it would be best to get together a team or committee of observers and to obtain an average view.

EXHIBITION OF DANISH DOMESTIC DESIGN

AT THE R.I.B.A.

21 FEB. TO 28 MARCH



One of the exhibition screens.

The Exhibition of Danish Domestic Design will open at the R.I.B.A., in the Henry Florence Hall, on 21 February, as announced in the last JOURNAL. There will be no formal opening ceremony. The Exhibition will be open daily from 10 a.m. to 6 p.m., including Saturdays, but will be closed on Sundays.

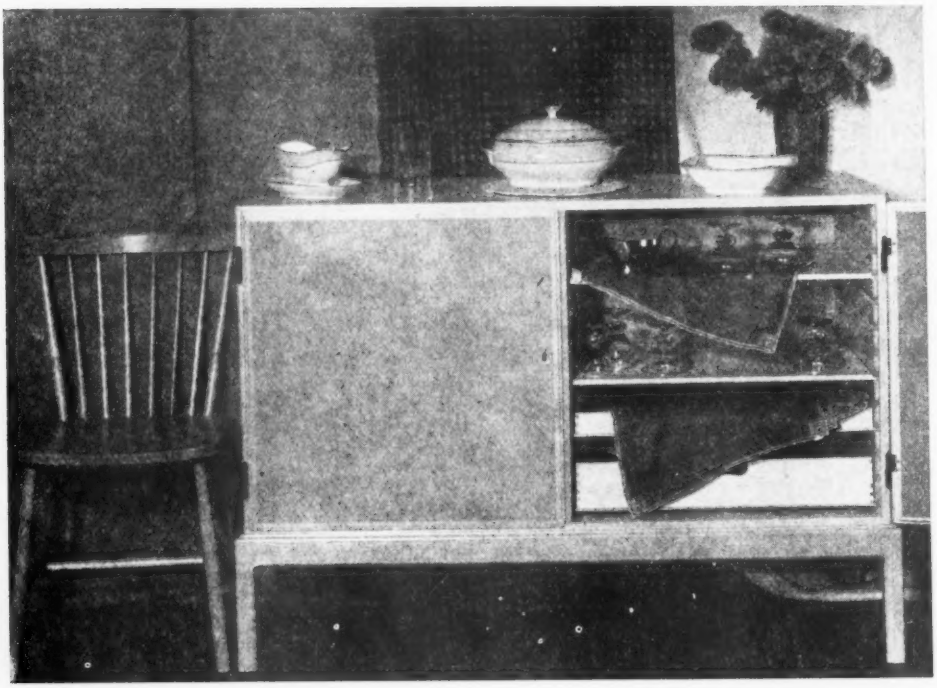
In view of the present interest in Scandinavian architecture and design, this exhibition will have a special appeal because it will consist of actual furniture and objects, and not merely photographs of them. A few of the exhibits are illustrated here and show the careful attention to detail, combined with simple lines and shapes which characterise Scandinavian design to-day. The colours, which we cannot show, are clear and bright.

The exhibition will consist of a wide range of furnishings, textiles, household utensils, etc., and aims to show how a Dane earning about £500 a year can furnish a modest home. No effort will be made to include furnishings of wealthy Danish homes, and it is probable that this limitation will be more interesting to us in these austerity days than a display of the expensive silver, china and porcelain which distinguish the wealthier homes of Denmark and for which the Danes have a long-established reputation.

Although a part of this exhibition has already been shown in this country, it has been augmented and re-designed to be displayed at the R.I.B.A. for its most important showing in England. The exhibits have been selected by The Society of Danish Handicraft and Industrial Art, with whom the Exhibition Committee have been in touch from the very early stages so that all the arrangements for its showing in the Florence Hall have been worked out in close collaboration.

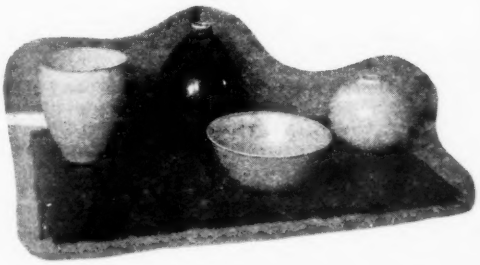
The Exhibition on the Swedish Home, recently shown in London, has made many people want to see more from Scandinavia, and this exhibition from Denmark provides such an opportunity. The Exhibition Committee, as part of their programme of keeping members and the general public informed about new and interesting work being done, is making further contacts with Scandinavia, and proposals have been examined for an exhibition of Swedish Housing which it is hoped to hold at the R.I.B.A. in the autumn, as well as for an All-Scandinavian Exhibition which is under consideration for 1948.

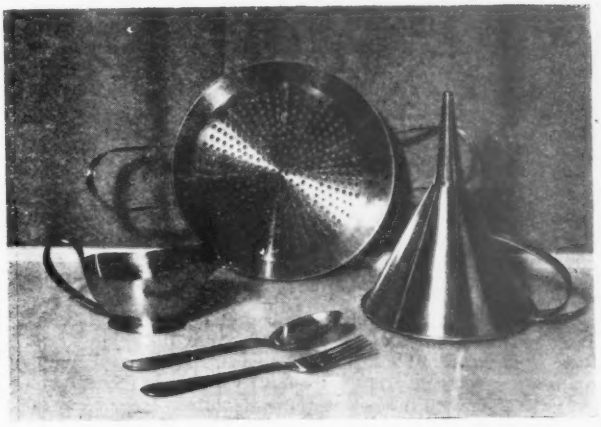
As with the high level of architecture at the exhibition of Swiss Planning and Building held at the R.I.B.A. last autumn, so in the sphere of design the Danish exhibition shows that the Danes too maintain a very high level of industrial design. They have been able to continue a natural condition of good design, less hampered by the effects of a century of industrialism than many other European countries where those principles have had to be rediscovered in the last fifty year. In Denmark the interest in handicrafts is natural and contemporary, very different from the self-conscious cult of the craftsman which has sometimes existed elsewhere. In complete contrast with the display technique used in "Britain Can Make It," the exhibits are being simply presented without elaborate scenic backgrounds and will have to be judged therefore entirely on their own merits.



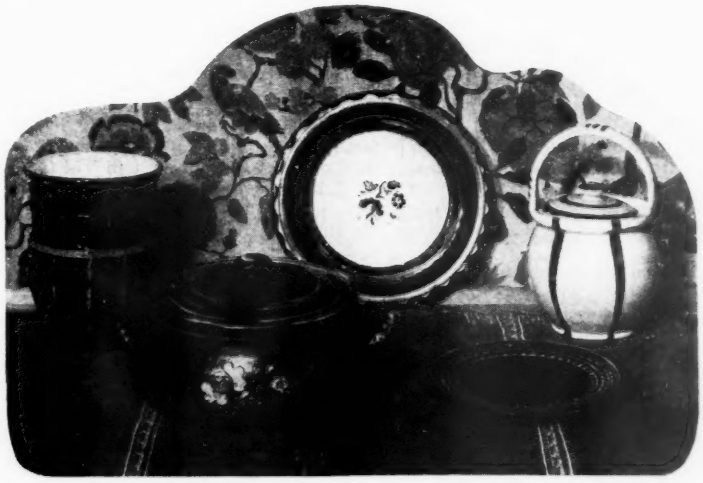
A chair and typical sideboard of simple design with a selection of its contents.

A group of tableware illustrating the characteristic attention to detail in very simple shapes.





Some selected exhibits. Inexpensive toys of good design, shapely kitchenware and simple decorative pottery. All the items are designed to be sold at prices to suit the modest home of an owner with a £500 a year income.



HEALTH AND WELFARE IN FACTORIES

A PAPER PRESENTED BY MR. H. G. MAULE, *(Formerly H.M. Inspector of Factories)*, AT A MEETING OF THE R.I.B.A. ARCHITECTURAL SCIENCE BOARD

WEDNESDAY, 4 DECEMBER, 1946

MR. C. C. HANDISYDE, [A.] *in the Chair*

Mr H. G. Maule until recently was on the staff of the Factory Inspectorate and is now a Lecturer at the London School of Hygiene.

The problems of health and welfare in factories are by no means new though perhaps there is at this time a growing interest in these problems. In order to put the position to-day into its proper perspective it seems necessary to glance at its historical setting. We must ask not only, " Where do we stand now," but also " Where have we come from " and " Where are we going to."

Compared with our own national architectural history, which we can probably date back to Stonehenge, our industrial history is relatively short. Industry itself was, in a primitive form, known before the time of the Industrial Revolution. The factory system, as we know it to-day, however, had its origin in the eighteenth and early nineteenth centuries. While any investigation into conditions before then may have considerable sociological and historical interest, it would have little relevance to to-day's subject.

I would prefer to start my study from the beginning of the nineteenth century. It is perhaps true to say that, apart from a limited number of exceptions, the general level of social conscience in the nineteenth century was at its lowest. The great textile industries were growing up. The first factories depended upon water for their source of power. They were often built in the remote dales of Derbyshire, in Yorkshire and Lancashire and elsewhere. The labour employed consisted to a considerable extent of the pauper children brought from the large towns. These children were housed in buildings provided by the manufacturers, generally adjacent to the mill. Children of the tenderest ages were compelled to work as much as fourteen hours a day for six days a week. Neither health nor welfare had a place in the mill owners' scheme of things. Such was the general run of industry at the beginning of the nineteenth century, though there were, of course, exceptions to the rule.

But even if public conscience was sleeping it was not dead and in 1802 the first of a series of Acts of Parliament designed to protect the health and safety and welfare of industrial workers became law. Looked at to-day from our modern standpoint this Act, " The Health and Morals of Apprentices Act," does not seem very momentous, but from the standpoint of its own times it was from this Act arose all the legislation which brought about the conditions we have to-day.

Lest we should judge the cotton manufacturers of that day too harshly let it be remembered that two of the names most closely associated with this Act were those of Robert Owen and Nathaniel Gould, the one a mill owner, the other a Manchester merchant. And the Bill itself was sponsored by Peel, who was himself a big cotton manufacturer.

Against the lead of these few men, however, the bulk of employers combined to oppose the introduction of anything so dangerous to industrial prosperity as governmental control. Despite the opposition the Health and Morals of Apprentices Act became law. It enabled local Justices of the Peace to appoint visitors who were empowered to inspect the working conditions in the textile factories and the living conditions of the bound apprentices. For good or ill, and surely everyone here will agree for good, for the first time the employer ceased to be an absolute and unrestricted monarch of his own business.

The next thirty years proved that this Act was almost still-born Attempts to rectify some of its weaknesses were made in the intervening years, but in 1833 the first really serious effort to control provisions of health and welfare was made. In that year the first Inspectors of Factories, four in number, were appointed and provision was made that children should have a medical examination before they started work in a factory. With regard to health and welfare, the hours of employment of women and juveniles were again restricted. How often have the good intentions of legislators been defeated by the very people it is intended to protect. In this case parents would often take their children from doctor to doctor until they found one willing to state that the child was of the required age. These four inspectors, however, certainly made a mark upon their contemporaries. The final sanction by means of which the Law was enforced was then, as now, by prosecuting.

It would be tedious to go through a historical survey of factory legislation, so I will come straight to the position as it is to-day. To-day the Factories Act, 1937, applies in part or in whole to almost every conceivable type and variety of industrial activity.

When thinking of factories one is apt to think of the large and well-known industrial enterprises—I.C.I., the great motor manufacturers, the chocolate and tobacco firms and firms of that sort. Let us not make the common mistake in thinking that firms of this size represent the majority of the factories in Great Britain, or that the majority of industrial workers are employed by such organisations. Figures that are available show that in 1936 the distribution of factories under inspection was as follows:—

	Factories with Power		*Numbers Employed*	
Size Group	*Number*	*Per cent. of Total*	*Number*	*Per cent. of Total*
1-25	108,765	76·9	709,943	12·8
26-50	12,636	8·9	447,824	8·1
51-100 . .	8,738	6·2	622,118	11·3
101-250 . .	7,155	5·1	1,134,048	20 5
251-500 . .	2,565	1·8	885,856	16·0
501-1,000 . .	1,016	·7	691,204	12·5
1,0001 upwards . .	519	·4	1,039,196	18·8
Totals . .	141,394		5,530,189	

Thus we see that at that time—i.e. in 1936—of the total industrial population working in factories in which mechanical power was used over 20 per cent. or 1 in 5 of the population were working in factories employing 50 persons or less. Though the main principles underlying industrial health and welfare may be identical whether 1,000 or only 10 persons are employed it is apparent the detailed application of these principles must be substantially different.

Let us then examine these principles of health and welfare and see in what way they can, and to what extent they do, actually apply throughout the industrial organisations in Great Britain. Before doing this let us clear the air by definition of terms. Health surely means something more dynamic and more positive than simply absence of disease. In speaking of health in factories we are considering the extent to which this potential dynamic health may be impaired or enhanced by the nature of the worker's occupation, by his surroundings and general environ-

ment dur[illegible] his working hours. However much we may wish to relate [illegible]dustrial health to general public health (and the relation a[illegible] interaction between the two must be recognised), to-night w[illegible] must keep the two things apart in order to limit the scope of [illegible]e discussion to the time at our disposal. We will consider [illegible]en only the effect that the *industrial* environment has on a wor[illegible]r's health and take no account of whether he lives in a slum o[illegible]n a garden city.

As architects your job may be to design, or alter or repair a building the use of which has been determined by your client. Whether he is going to make utility furniture or motor cars, is a matter over which you have—I presume—little control. You will have considerable control, however, over matters such as the heating, the ventilation, the lighting and the structure and materials for the building. You may be called upon to deal with fumes arising from industrial processes, and other problems of that nature. What, then, do the factory department regard as the essentials in any factory? Remembering that many workers, from the age of 14 until—and indeed often after—they draw their old age pensions spend nearly one third of their lives and probably nearly one half their waking hours in the factory what have they the right to ask for? Surely, to begin with, the place should be clean, airy and bright. The old "satanic mills" of the nineteenth century are as inappropriate for housing workers as the mud huts and caves of the ancient Britons are to-day for housing the family at home. Let our factories be bright, clean and colourful. Let the sun, when it shines, shine into the workrooms. The very weeds in the fields needs sun. Should the industrial worker be denied it? Let the walls be of such material that they can readily be cleaned; let them be a light colour that reflects this sun.

The British Colour Council, an organisation that this Institution will surely know well, has examined the problem of colour in the factory, and has published suggestions on colour schemes for different parts of the factory—for the canteen, the workrooms—the rest rooms and so on. You the architects and we of the factory department should persuade industrialists to be courageous in their ideas and escape from the drab traditional whitewashed walls. Colour surely is life and life is an essential if health is to follow.

The Factories Act is quite clear and precise over the question of the cleanliness of a factory. In addition to the routine daily or weekly cleaning of floors and benches it is necessary, with certain exceptions, to treat the walls with paint or whitewash periodically. The details of such treatment are laid down in an Order, "The Factories (Cleanliness of Walls and Ceilings) Order 1938," and the observance of the Order is a matter with which the factory occupier is chiefly concerned, but the architect can advise on the type of ceilings and walls which lends itself best to being kept clean.

The method by which the walls and ceilings are treated should have regard to the nature of the industrial process. Limewash or whitewash is very apt to flake particularly where hot or steaming processes are undertaken, and it is seldom so satisfactory as a good quality paint. The importance of cleanliness cannot be over-estimated and very often a word of advice from the architect may prevent a prospective employer from falling into some of the pitfalls that await the unwise or unwary.

I should like next to make a few remarks about the question of the heating and ventilating of the prospective or actual factory. The two subjects are inextricably mixed. All sorts of complications may arise and the heating arrangements, which may be thoroughly satisfactory on the drawing board, may prove to be quite inadequate in practice.

It is true to say that a great many industrial processes give rise to dust, fume or other impurities which, by law, must be removed. For example, where articles (if you like motor cars) are being paint sprayed a rough measure for the ventilation may be obtained from estimating the number of changes of the air in the spray room per hour. The figure of 30 changes per hour has been given as a measure to aim at. It is perfectly apparent that if the air in the workroom is to be replaced by air from the outside every two minutes, the heating arrangements must make allowances for this fact, and it is improbable that the architect responsible for designing the heating would fail to do so. The same principles, however, may not always be followed in other instances. Remember that *wherever* any process is carried on which gives rise to dust, fume, or other impurities liable to be offensive or injurious appropriate precautions must be taken to prevent these products from entering the air of the workroom.

Nine times out of ten the appropriate precautions necessitate the introduction of a system of local exhaust ventilation by means of which the offending substances are sucked away. How many architects are informed by their clients of the possibility of such processes while the building is still on the drawing board? And yet if you don't know what is going to be done in the workroom, and know in some detail, how can you hope to provide the heating and ventilating systems suitable for that room and those processes? I would like to stress that there are to-day, in all manner of industries, a great variety of processes of the nature that I have mentioned. I doubt whether an architect can rely upon the client offering him the information. If he is to get the results he requires the architect must extract the information from the industrialist, and at least get some indication of the way in which the plant and machinery in the workrooms is going to influence the physical character of the atmosphere so that he can make the necessary allowances at the very outset.

I will not waste the time of this audience by going into any detail of the principles of heating and ventilation. They are no doubt more familiar to you than they are to me. The only statutory point which may be of interest is that the Factory Act does in fact lay down a certain minimum figure for temperature. In any room in which a substantial proportion of the work is done sitting down the temperature should not be less than 60 degs. F. after the first hour's work. There is also a detailed schedule relating to temperature and wet bulb readings in those factories in which artificial humidification is carried out. This is such a special case, however, that I will do no more than mention it in passing.

From heating and ventilation we come to lighting. To-day, after six years of black-out, we are probably more light conscious than we were before the war. Nevertheless it is quite remarkable how little thought has been given in the past to the question of lighting the factory building. When speaking of lighting one generally thinks of "artificial lighting." Discussions centre around the problem of artificial lighting and the maximum use of natural daylight is often overlooked by industrialists if not by architects. Let us have good artificial lighting by all means, but let us not forget the light of the sun. What I said earlier about making the factory a bright, cheerful place could be said again.

With regard to artificial lighting my own experience, both as a factory inspector and before that, is that it is a terribly neglected subject. It is quite exceptional to be able to say of a factory that the lighting system leaves nothing to be desired. In 1941 The Factories (Standards of Lighting) Regulations (S.R. & O. 1941, No. 91) were brought into force. These Regulations set minimum standards of light intensity for different parts of the factory, and make provisions whose object is to prevent that irritating and fatiguing factor—glare.

In my own view—one incidentally that is supported by the recommendations of the electric lamp manufacturers—the standards laid down by law are still extremely low. For example the general illumination over those parts of the factory where persons are regularly employed shall be not less than six foot-candles. The figure is, however, only to be regarded as the minimum and even if this were achieved in every case it would probably result in a general standard of improvement in a large number of existing factories. Let is be remembered that the Regulations have only a very limited application, and that the supply and demand position since they came into force have made it extremely difficult for even the best intentioned employers to comply with them.

Before leaving the question of lighting a word must be said about the modern type "fluorescent" lighting. I believe that there has been some research in the U.S.A. into the alleged

physiological defects of such lighting. So far as I know, however, there is no support, from work done in this country, for the view occasionally put forward that fluorescent lighting is bad for the eyes. There is, however, one danger that must be acknowledged and for which the necessary allowance must be made. I refer, of course, to the stroboscopic or flicker effect that is sometimes found with lighting of this sort. Where high speed machinery, particularly such as circular saws and so on, is in use, this stroboscopic effect may give the illusion that a machine is standing still while it is actually rotating at a high speed, which may be dangerous for the operator. So far as I know modern fittings have largely overcome this defect, and where it occurs it can be avoided by correctly wiring up the adjacent fittings on different phases of the current. Another point that it is particularly important to watch is the lighting of stairs, passages, doorways and similar parts of the factory. The saving in money effected by failure to light stairs may soon be lost through the unnecessary falls that occur as a result of the unnecessary gloom.

We have now considered some of the fundamental physical properties of a room in which people are to work. How many people are we going to allow in each room? The answer is clearly given in the Factories Act. Four hundred cubic feet of space must be allowed per worker, and when working out the space in the room no space more than 14 feet from the floor shall be taken into account.

Every item that has been mentioned so far has a direct bearing on that " positive health " that we are regarding as the standard to aim at. Every single item is of profound importance to every worker, whether one of 10,000 employees or whether one of twenty. The size of the factory is immaterial. Big or small it should provide these fundamentals of positive health, and the architect can do very much to see that the progressive employer gets what he wants and that the backward one gets what is good for him.

There are some things which while desirable or even essential in the big works are clearly of less importance in the smaller works. The most obvious item relating to health is the ambulance or first aid room. There are certain classes of factories, determined by their size and the nature of their work, where the provision of a first aid room is a statutory requirement; for such factories a minimum standard (for size and so on) is laid down. Particulars of this minimum standard appear in the various welfare orders. But it is unlikely that a firm with the good sense to engage an architect would make it necessary for that architect to have to worry unduly about minimum standards. These are so far below the optimum that there is little danger of the architect producing something that is not up to legal requirements.

If, as one would expect, a nurse is to be in attendance it should be remembered that the factory nurse generally has a good deal of clerical work to attend to. She keeps records of injuries, of absence and of treatment. To do this satisfactorily she *must* have a proper office adjacent but definitely outside the " treatment room." To you this might appear so obvious that you wonder at my mentioning it; my reason is that it is relatively unusual to find that this elementary need has been provided. It is quite common to find the room for treatment, the cubicles for rest and recovery, and the room for the nurse's clerical work all within the same set of four walls that one is quite surprised to find anything else. Ideally, I should say, the first aid unit should have a waiting-room, its size related to the number of workers employed, and the nature of the work, an office for the nurse, a room equipped for treatment, and two rest rooms, one for men and one for women who need to rest before returning to work or before being dispatched home or to hospital as the case may be.

I hesitate to say too much about the equipment, but I would venture two observations. Some firms provide such facilities as sun treatment and the like. Where this is done it should be remembered that at any time some one may come in requiring immediate attention. Let the plan be so arranged that the patient receiving the sun-light treatment is not inconvenienced and perhaps embarrassed by the arrival of an injury case. A small separate annexe for this special treatment equipment is necessary.

The second point I venture to mention is the provision of a foot-bath. Particularly in some industries, foundries, heavy engineering, etc., foot injuries are very common. Before treatment it is essential to wash the foot, and what is more undignified for a burly foundry man than to hop about on one foot while he tries to get the other into a hand wash-basin? Here again it is only because of the practical experience of seeing typical first aid rooms that I find this elementary point worth mentioning. I have seen a great many ambulance rooms, but in few of them have I seen a foot basin.

Finally, the needs of the nursing staff. Don't forget the W.C. for the nurses. There should be one attached to the ambulance room. And this leads me on to the general topic of the sanitary arrangements of the factory. The minimum number of sanitary conveniences is of course laid down in the Sanitary Accommodation Regulations 1938 (S.R. & O. 1938, No. 611). Few employers are in doubt about the minimum number required. To avoid any doubt here are the figures:—

For female employees one sanitary convenience for every 25 females. That is to say where up to 25 are employed one is required. From 26 to 50, two and so on.

For men the basis is the same, but after the first hundred employed, provided that there is sufficient urinal accommodation, one convenience for every 40 men is sufficient.

The convenience should be ventilated and not open direct into a workroom except through an " intervening ventilated space." All this is very simple and clear cut. Where mistakes are made is often not in connection with the numbers or construction of sanitary conveniences, but with the location in the factory. A many-storied building should always have conveniences for both men and women, if both are employed, on every floor. It may ease the plumbing problems to collect all the conveniences together on one block, but it does not meet the human needs.

In my view washing accommodation should be associated with sanitary accommodation. There is no rigid standard for washing accommodation. All that is laid down is that there shall be provided and maintained adequate and suitable facilities for washing. Clearly adequacy is related to the nature of the job. For light clean work the number of wash basins need not be so great as where the work is heavy and dirty. In certain trades showers or baths must be provided, but this is only where there is a special health risk. As a rough guide I think one can say that for hot or dirty work—e.g. foundry work—there should be the equivalent of one wash basin per five workers, and similarly for certain trades with specific health risks, e.g. lead. As the work gets progressively lighter and cleaner the number can be reduced and still be adequate—perhaps one basin per 15 or 20 workers is sufficient under the most favourable working conditions.

I know well enough that it is held by some employers that even if good washing accommodation is provided it will not be used. This is only the old fable of keeping coals in the bath, and I don't think it needs to be taken too seriously. Those who have never had the opportunity to keep themselves clean in the past may have to break down past dirty habits and pick up new clean ones. Surely the architect should throw his weight into this side of the new habits and provide the best he can.

The older firms, older either in the buildings or the mental outlook of their directors—may argue about the provision of hot water. There is at present nothing positive laid down on this point, but I doubt if the firm who employs an architect will want to argue about it.

There are, of course, various alternatives to individual hand basins and some of these may be suitable in particular instances —I am thinking of the large circular basin with a central rose, round which eight or ten men may wash at the same time. I am

hesitate to compare the different merits of the alternatives. They may depend upon special local conditions as to space available, and so on.

The Factories Act also requires that suitable accommodation should be provided for clothing not worn during working hours, and that there should be arrangements for drying the clothing. The obvious arrangement of a central cloakroom does not always meet the case. In an engineering shop, for example, the machine operators change their jackets for overalls, and often do not like to be parted from their jackets. The provision of a single central cloak room may lead to pilfering. Though on the face of it steel lockers would meet this difficulty, in fact they may produce additional problems of drying. Different firms tackle the problem in different ways. If the firm is not too big a central cloakroom in the continual charge of a responsible person may serve. Where the factory is large and scattered over several buildings this does not do, however, as people may get wet when going from the cloakroom to their workplace. Every individual case must be considered on its individual merits, but if the difficulties are recognised at the outset, there is every chance at arriving at the best solution.

Finally a word about canteens. Before the recent war it was relatively unusual to find canteens in factories. In 1940, however, presumably as a part of the nation's food policy, an order was passed which applied to factories engaged in war work in which more than 250 persons were employed. In 1943 the order was applied to any factory employing more than 250 persons, irrespective of the nature of the work. This order gave the Chief Inspector of Factories power to direct the factory occupier to provide suitable canteen facilities where hot meals could be furnished for the persons employed.

In March 1946 the approximate number of factories and similar premises with canteens was as follows:—

Factories subject to the Factories' Canteens' Order	4,753
Factories not subject to the Order	6,910
Canteens in docks	176
Canteens on building sites	181
Total	12,020

Twelve thousand canteens catering for the industrial population is an impressive figure. And in addition there are many others which give some feeding service.

One can come down to the question of how the canteen should be planned and here I do not wish to pose in any way as an expert. Expert advice is available and I would most strongly urge that full use should be made of this expert advice. In particular I would refer to the Canteen Advisory Section of the Ministry of Labour and National Service Factory Department. The headquarters of this Service is at 8 St. James' Square, but contact can be made with advisers through the office of any District Inspector of Factories. The staff of the Canteen Advisory Section under the direction of a Superintending Inspector of Factories consists of a group of experts in all matters related to canteens ; lay-out, design, accommodation, equipment and, of course, to the catering, once the canteen is functioning.

The second body of experts is to be found in the Industrial Welfare Society, 14 Hobart Place, S.W.1, who have published their book, *Canteens in Industry*, which is a guide to planning, management and service of industrial canteens. Advice of one or other or even both of these organisations is probably indispensable if the best service is to be provided.

I will not attempt to encroach upon the province of these experts, but there are one or two points which I might be permitted to make. In the first place it should be remembered that a canteen is not simply a place into which people come to scratch a hurried meal and then return to their day's work. It is essential if the best use is to be got out of it that the accommodation is clean and bright, the food is good and inexpensive, the service quick and efficient and the general atmosphere friendly. Much of this, of course, depends upon the way in which the canteen is run, but a great deal also depends upon the actual design of the building.

I have said already that a canteen should not be used simply as a place in which meals are eaten. It can also be a centre for all sorts of social activities. Where the site permits it, this possibility should be borne in mind and a long narrow hall should be avoided. If it is thought of in terms of a potential recreation room, perhaps even a concert hall, the needs of these two items will be borne in mind by the designer. The possibility of a small stage should not be overlooked. During the war canteens were frequently used for lunch-time concerts either provided by an outside organisation such as E.N.S.A. or by the workers themselves, and this habit did not end on V-J Day.

With regard to the number of people likely to use the canteen this is, of course, a most important point to bear in mind and it would be unwise for me to quote general figures. The information should be given to the architect by the firm after they have made detailed enquiries into the matter. The dining space required would depend not only upon the number to be catered for at each sitting, but also upon the size and arrangement of the tables. The following figures are given by the Industrial Welfare Society : for square tables seating four people 10-12 square feet per diner, must be left. For long tables seating 12 or more with benches instead of chairs it is possible to manage with 6 square feet per person, but how many of you in this audience would select benches in preference to chairs ? Surely the industrial worker is entitled to some of the comforts that each one of us would expect for ourselves. The general practice for works' canteens is to have tables seating six or eight and to allow 8-10 square feet per person, a figure which includes gangway space. If the canteen is to be used for concerts, dances, etc., pillars should be avoided. In speaking of the total accommodation required, it is essential to allow for adequate accommodation for the following:—Dining-room. Service area. Kitchen. Washing up. Storage. Manager's office. Cloak rooms, etc., for the kitchen staff. Cloak rooms for diners if the canteen is away from the works' cloak rooms.

Questions like the size of the storage accommodation can only be determined by the expert, but no doubt minimum and optimum figures for this can be obtained. As a factory inspector I frequently had to deal with canteens which had been planned without adequate consideration being given to many of these items, particularly adequate storage and service space. Some figures which the Industrial Welfare Society recommend may be quoted with regard to the general space required for kitchens, washing-up, storage, etc. :—

1. For the small canteen serving 100-200 meals at a sitting about half as much as the dining-room space or more, say about 5 square feet per diner, should be left. The larger the canteen however, the smaller the ratio of kitchen space, etc., to dining-room.

2. Where the lunch hour is spread over, calculations for the kitchen would be slightly different.

3. If a large number of employees bring their own food and buy only tea or snacks the kitchen space allowed for them will, of course, be less than for the people taking full meals. These are facts which can only be allowed for if the management will take the trouble to give the architect the results of a specific and definite enquiry that he makes before-hand. I would again plead that the architect should insist upon the factory occupier giving him all these particulars. Such an enquiry, however, cannot be made where a new factory is being designed and advice should be sought from one of the bodies already mentioned. A point that should not be overlooked is the question of colour and lighting. The British Colour Council of 28 Sackville Street, W.1, have published a brochure on colour schemes for internal decoration, including canteens, factories, offices, etc. Points that they mention should be considered and all materials should be easily cleaned, particularly table-tops, floors and kitchen equipment, including the serving counters. They recommend that plain or patterned material in good colours should be

introduced in table cloths, chairs, etc. Decorative features such as mural paintings provide a source of interest and make the canteen more attractive and homely. While they give particular recommendations for colour schemes their general recommendation is that colours should be clean and cheerful and that those which may possibly be distracting should not be used in too large an area. Perhaps to-day anything that distracts us from our food is an advantage : there I am speaking, of course, of post-war time.

Finally it is important to remember that the canteen, like the London Suburban Railways, is either in a fever of activity or else is nearly empty. It is essential that the entrances and exits should be capable of dealing with the rush of people that arrive two minutes before a meal time and leave two minutes after it.

Remarks that already have been made about heating, lighting and ventilation are no less important in the canteen than they are in the workroom. The best form of lighting is daylight. With regard to heating the recommended temperature is from 62-68 deg. F. The exact form of heating will depend upon the size of the canteen and various other factors. The importance of lighting and ventilation in the canteen itself are so apparent as to need no further emphasis.

I will not say anything more about canteens except to repeat that the difference between a good canteen and a bad one (and I don't mean the meals served in it) is so striking that it is worthwhile to discuss plans in detail with the catering expert when the design is first contemplated.

In conclusion I should like to repeat that very much of what I have said must be very elementary to most of you. In my work in the Factory Department, however, I have found on many occasions that proper attention is not always paid to the simple and obvious. One might ask whether these things matter ?

Can industry afford this higher standard of facilities for the health and welfare of the industrial population ? If we provide all these things are we not going to impoverish the nation and make it impossible for this country to compete with the less favoured industrial workers of other countries ? This same question has been asked before and the answer was given by Lord Macaulay in a speech on the Ten Hours Bill in the House of Commons in 1846. He was thinking in terms of shorter hours and a week-end for rest after a long week's work, but the same applies to our problems to-day. "The only difference between Campania and Spitzbergen is trifling," he said, "when compared with the difference between a country inhabited by men full of bodily and mental vigour and a country inhabited by men sunk in bodily and mental decrepitude. Never will I believe that what makes a population stronger and healthier and wiser and better can ultimately make it poorer."

The CHAIRMAN said before opening the meeting for general discussion he would ask Mr. L. J. Fowler to start them off.

DISCUSSION

Mr. L. J. Fowler, opening the discussion, said he had come to the conclusion that present British practice was sitting quite complacently beneath the laurel wreath of its past achievements and that little progress had been made in the last twenty years. He felt that in certain aspects heating in factories could well be and had got to be improved, when we bore in mind the fuel situation which existed to-day and which was not likely to ameliorate for a very long time.

Factory heating differed fundamentally from heating large buildings, in that a factory building was nowadays invariably light in structure, whereas the normal large office building, hotel, etc., was a much more massive edifice. In the latter case a large quantity of heat was necessary to heat up the structure, and when it was once heated it formed a reservoir which, to a considerable extent, levelled up the temperature within the building and made impossible any rapid substantial changes of internal temperature.

The light structure of a factory, however, presented an entirely different problem. The heat capacity of the structure, or if he might use the term, its "specific heat," was low and the temperature within the working space could be raised or lowered rapidly. Furthermore, heat losses per cubic foot of space were high, compared with that in the traditional large building. It followed, therefore, that a factory building not only lent itself more readily to thermostatic control and intermittent heating, but its high heat loss made it more necessary that such a process should be attempted.

Automatic control gave two results, first a steady temperature ; second, fuel economy, and this was undoubtedly the most important factor under present circumstances. If the factory worked for 44 hours a week it was necessary to heat the shops to 60 deg. F. for 48 hours, making allowance for dinner hours. The average winter temperature in the South of England was about 43 deg. If a hundred tons of coal were necessary to heat a factory in the winter months continuously to 60 deg. F. all the week, then only thirty-six tons were required to heat it to 60 deg. F. during working hours, and to 45 deg. F. during nights and week-end. He was not suggesting that in most factories it was the practice to maintain the heating fully at 60 deg. F. during non-working hours, but he did suggest that existing plant in many cases left control to individuals and that as a result the two-thirds saving of fuel was nowhere near approached. There was no reason whatever why this should be so : suitable plant was available to make this control fully automatic, and in no way dependent on the human factor : the heating could be switched off when the workers went home, and could be left off overnight and at week-ends, and there was not only a considerable reduction in the running costs of the factory, but simultaneously a contribution to the national economy.

Conversion of existing equipment was often possible, and he hoped that all concerned—the owner, the architect, and the heating engineer—would bear this in mind when new works were being designed. He thought it perfectly horrid to study the words of the Factory Act, which laid down that the temperature should not be less than 60 deg. F. "after the first hour's work." It was quite unnecessary that the plant should go automatically at full load at 6 or 7 a.m. He wished to stress the point that the structure of factories made this automatic control and intermittent heating a really practical proposition.

He had been interested in Mr. Maule's reference to air changes, and he felt that there was a great deal of ill-considered talk on this subject. The volume of air represented by one air change in a factory was quite considerable, and he felt it most unlikely, except in, say, a foundry, that it would be possible to admit much more air than one air change without providing definite means of heating it as it entered the building.

He felt that in the past a great deal of useless equipment had been installed and a great deal of capital tied up without purpose, when heating installations have been designed to cover more than one air change, the calculation being made on the basis of an air temperature of 30 deg. F.

The remarks he had made regarding intermittent heating in factories applied equally to canteens. Again, plant was available which would give comfort which was quite satisfactory, and would automatically save fuel during the hours when the canteens were not in use. Usually canteens were of light structure nowadays, and the load factor was a very bad one. The place needed to be warm when the workers came in, but when the canteen was crowded the demand for heat was very small, and the time for which it must be maintained at full factor was small.

Mr. M. Hartland Thomas said he would like, in congratulating Mr. Maule on his address, to remark on the general flavour of it, which he felt was so satisfactory. The Factory Act, and the way it was operated, was so unlike the Building Bye-laws which were such a nuisance to us always. There was no question here of absurd regulations laid down three generations ago which were tying our hands from doing the work we wanted to do. Mostly they had to deal with gentlemen like Mr. Maule who would come and explain things. He would like to bear witness from experience to the value of his advice to consult the Inspectorate of Factories' canteen advisers. They would come and talk to an architect on his drawing board : the advice they brought was excellent, and somehow surprising. For instance, the proportionate size of kitchen and kitchen accommodation was certainly larger than one's client ever expected, and was often a surprise to ourselves. In that connection he would ask Mr. Maule if one could count on getting the same sort of advice in the difficult matter of rest rooms and first aid rooms ; there was not much doubt the answer would be "yes."

On canteens, the question of placing them : what was Mr. Maule's view about the position, in relation to the work place ? It was often said the canteen should be put near to the work place so that not much work time is wasted in getting there. On the contrary, he

would suggest it was far better for everybody's health and spirits to place it far from the work, so that they had a complete change of atmosphere.

Another point on which he would like an opinion was the placing of cloakroom and washing facilities. In some businesses, where cleanliness at the work is important, the obvious solution was to place a wash basin actually in the work room.

As to colour in factories, he had been taking decisions very often recently, but had not quite got the results to report yet. He strongly suspected the British Colour Council were not right in suggesting that distracting colour was a bad thing in canteens. Surely in canteens something lighter and also something more lively in corridors and odd places were needed. Where there must not be distracting colours was where people were working, because it was irritating when they should be focussing on their work.

Mr. J. B. Bickerdike said there were no standards other than the Factory Act laid down. Those standards appeared to relate mainly to quantity temperature, air change, lighting, and so on. There were no quality standards, and he realised that these were very difficult to set, but had the Factory Inspectorate any records relating to factory accidents and their causes? For instance, were there any notes against factory accidents showing that a particularly nasty bit of lighting was the cause? The same applied to noise. If there were such a source of information, it would be extremely useful to research bodies in trying to formulate quality standards as opposed to quantity standards.

Regarding colour, there again there was not very much information available as to what colour one should adopt. Physiological and psychological factors came into the matter. Would it not be useful if the factory management or welfare section of the factory kept records of workers' reactions and workers' ideas on working conditions: this would assist the research bodies in finding out what are really the criteria.

Mr. R. Eve said he wished to place himself in the position of being an architect facing a board of directors of some industrial undertaking and trying to persuade them to adopt all these practices that Mr. Maule had outlined. Could Mr. Maule give some guidance as to where they might turn for expressions in £ s. d. of the advantages, if any were known.

Secondly, he would like something to lay aside his fears that he was being asked to build merely a sort of very nice ant heap. Would he personally care to work in one of these beautiful factories, say a light engineering repetitive action factory? He would rather work at putting in a heating system, and doing such craftsmanship as there was in that, in a cold and chilly house, than work in air-conditioned surroundings. Was there anything to indicate what path humanity might follow in that line? He presumed it lay in the path of industrial psychology.

Mr. J. A. Emlyn thought one of the most important factors in the welfare and health of workers was the question of noise. Did Mr. Maule think that it was better to have a factory that was one large shell where you got a communal spirit, and where you also got noise at a maximum, or had he found the workers more happy and contented where such a shell had been sub-divided into smaller units, perhaps more friendly, quieter, and where the workers could get on with their job without this regular din over the whole building?

The Chairman said he wished to ask whether Mr. Maule could say whether any consideration had been given to laying down a standard of daylight in factories.

Secondly, the question of sound insulation in large workshops. There had been a certain amount of research work done in America on that. Had Mr. Maule come in contact with any deliberate attempts to deal with that problem over here, and if so, had they been successful?

Regarding colour, had Mr. Maule had any experience of attempts to brighten up the place by keeping a light floor colour?

Mr. J. K. Barraclough said in regard to lighting, there were many cases where it was important that the lighting should be of a uniform quality throughout the whole length of the day, and one should endeavour to get as much natural daylight as possible.

With regard to colour, the first and focal point was the working area of a bench or machine. There were strict rules laid down which governed the possible colours and their refraction value. Once that colour had been placed, the architect could devise a colour scheme round it. It must be placed subject to certain rules which were most important. As an example: if one were dealing with a lathe on which brass was to be turned, the working area visible to the operator should be a neutral grey with 5 per cent. refraction of the brass used. If he were turning steel he would not require a grey background because of there being no contrast between the steel and the background: he would require a yellow background, with slightly less refraction than the steel being used.

The Lecturer (**Mr. H. G. Maule**) said so many questions had been asked that they could be certain he would not attempt to answer some of them, and he would only skate over others, and keep to those on which he felt on the surest ground.

As to whether advice was available on such matters as rest rooms and first aid rooms, the same type of advice was available as for canteens.

Regarding the placing of cloakrooms and washing accommodation, there was not simply one answer. Quite frankly, he thought it was true to say that the average industrial worker would rather have a nail in the wall behind his machine and hang his coat there. A decent cloakroom with properly spaced pegs and drying accommodation, and a proper person in charge of it, was probably the thing to be aimed at.

There had been a lot of discussion on colour. He did not feel competent to embark upon answering that, except that the old battleship-grey machines, the old grim grey walls, were things they were trying to fight against, and almost any change would be a change for the better.

As to colours in the canteen being distracting, he rather questioned the Colour Council's remarks himself: he was not sure that he agreed with them that colours should not be distracting in the canteen. They had, however, done much more research than he, so he did not want to enter into a fight with the British Colour Council.

NOTES AND NOTICES

NOTICES

The Sixth General Meeting

TUESDAY, 11 FEBRUARY 1947, AT 6 P.M.

The Sixth General Meeting of the Session 1946-47 will be held at 6 p.m. on Tuesday, 11 February 1947, for the following purposes:—

To read the minutes of the Fifth General Meeting held on 28 January 1947.

The President, Sir Lancelot H. Keay, K.B.E., M.Arch., to present the Medals and Prizes 1947 and to deliver his address to architectural students.

Light refreshments will be provided before the meeting.

The Seventh General Meeting

TUESDAY, 25 FEBRUARY 1947, AT 6 P.M.

The Seventh General Meeting of the Session 1946-47 will be held at 6 p.m. on Tuesday, 25 February 1947 for the following purposes:—

To read the Minutes of the Sixth General Meeting held on 11 February 1947; formally to admit members attending for the first time since their election.

Mr. Edward Armstrong [*F.*] to read a paper on "Urban Housing—Planning for Amenity."

Light refreshments will be provided before the meeting.

Session 1946-47

Minutes IV

At the fourth general meeting of the Session 1946-1947, held on Tuesday, 14 January 1947, at 6 p.m., Sir Lancelot Keay, K.B.E., President, in the chair.

The meeting was attended by about 150 members and guests.

The minutes of the third general meeting, held on 10 December 1946 were taken as read, confirmed and signed as correct.

The following members, attending for the first time since their election, were formally admitted by the President:

Fellows:

D. Clarke Hall, Lionel F. R. Coote.

Associates:

L. R. Barlow, R. M. Betham, J. R. Bhalla, J. R. P. Brooke
L. W. Elliott, E. R. Janes, M. J. F. Secrett, R. D. Thornley.

Licentiates:

J. Curtis, H. Baden Hawes, R. D. Lynde. N. J. Rushton, P. R. Wright.

The Secretary having read the Deed of Award of Prizes and Studentships made by the Council under the Common Seal, the sealed envelopes bearing the mottoes of the successful competitors were opened and the names disclosed.

Mr. Anthony Minoprio, M.A., B.Arch., A.M.T.P.I. [*F.*], read his review of the works submitted for the Prizes and Studentships, 1947, and illustrated it by lantern slides.

On the motion of Mr. A. B. Knapp-Fisher [*F.*], Chairman of the Board of Architectural Education, seconded by Mr. J. S. Walkden, M.T.P.I. [*A.*], Head of the School of Architecture, Regent Street Polytechnic, a vote of thanks was passed to Mr. Minoprio by acclamation and was briefly responded to.

The proceedings closed at 7.15 p.m.

R.I.B.A. Annual Dinner 1947

The Annual Dinner will take place on Friday, 21 March 1947, at 7 for 7.30 p.m., in the R.I.B.A. Henry Florence Hall, 66 Portland Place. Full particulars were contained in the circular letter to members enclosed with the JOURNAL for 13 January. Applications for tickets, which must be accompanied by cheques or postal orders, must reach the Secretary, R.I.B.A., not later than Wednesday, 19 February.

British Architects' Conference

DUBLIN, 11-14 JUNE 1947

The next Annual Conference of the R.I.B.A. and its Allied and Associated Societies will be held at Dublin from 11-14 June 1947, inclusive.

The Royal Institute of the Architects of Ireland have in hand the preparation of a most attractive programme and particulars will be issued in due course.

Exhibition of Prize Drawings

15 JANUARY TO 12 FEBRUARY 1947

The Annual Exhibition of Designs and Drawings submitted for the Prizes and Studentships 1947 will be open at the R.I.B.A. from Wednesday, 15 January to Wednesday, 12 February 1947 inclusive. The Exhibition will remain open daily (Sundays excepted) free to the public between the hours of 10 a.m. and 6 p.m. (Saturdays 10 a.m. and 5 p.m.).

The Reception of New Members at General Meetings

The procedure for the introduction and reception of new members at General Meetings is now as follows. New members will be asked to notify the Secretary beforehand of the date of the General Meeting at which they desire to be introduced and a printed postcard will be sent to each newly elected member for this purpose. They will be asked to take their seats on arrival in a special row of seats reserved and marked for them. At the beginning of the meeting, on the invitation being given to present themselves for formal admission, each new member will be led up to the Chairman by one supporter, and the Chairman will formally admit him to membership.

The introduction and reception of new members will take place at any of the Ordinary General Meetings of the Royal Institute *with the exception of the meetings on the following dates:*

11 February 1947. Presentation of Medals and Prizes.

15 April 1947. Presentation of Royal Gold Medal.

Part-time Study for R.I.B.A. Examination

The R.I.B.A. has been notified that several students who desire part-time or evening training in architecture have been unable to secure admission to a suitable technical college or art school. This matter is receiving the Institute's attention and the Secretary would be glad to hear of any students who experience difficulty in this direction.

Composition of Subscriptions for Life Membership

Fellows, Associates and Licentiates of the R.I.B.A. may become Life members by compounding their respective annual subscriptions. Full details may be obtained on application to the Secretary, R.I.B.A.

The Use of Titles by Members of the Royal Institute

In view of the passing of the Architects Registration Act 1938, members whose names are on the Statutory Register are advised to make use simply of the title "Chartered Architect" after the R.I.B.A. affix. The description "Registered Architect" is no longer necessary.

Correspondence with the Institute

In order to facilitate speedier attention to correspondence, and to relieve the staff of a great deal of research, it is particularly requested that Members and Students will kindly state in all correspondence with the Institute the class of membership (F., A., L. or Student) to which they belong.

Associates and the Fellowship

Associates who are eligible and desirous of transferring to the Fellowship are reminded that if they wish to take advantage of the next available election they should send the necessary nomination forms to the Secretary, R.I.B.A., as soon as possible.

Members and Professional Affixes

The Council's attention has been called more than once to the practice, among some members, of adding a string of letters of doubtful value to the affix indicating membership of the Royal Institute on their letter paper.

This is a matter in which the Council obviously cannot dictate to members, and must trust to their good sense. It should be obvious, however, that the affix of a chartered body of high standing is weakened in effect by the addition to it of a string of other mysterious designations some of which probably indicate no more than the payment of an annual subscription.

BOARD OF ARCHITECTURAL EDUCATION

R.I.B.A. Intermediate Examination, November, 1946.

The R.I.B.A. Intermediate Examination was held in London, Manchester, Leeds, Newcastle, Edinburgh, Belfast and Cardiff from 8 to 14 November 1946.

Of the 282 candidates examined, 124 passed and 158 were relegated. The successful candidates are as follows:—

*Andrews, B. G.
Austin, D. H.
Aylwin, John M.
Bailey, John D.
Baker, Alfred P. E.
Ball, Alfred
*Bennett, Philip H. P.
Benton, H. F.
Bestwick, D.
*Birch, F. L.
Borley, A. P. G.
Boucher, E. J. T.
*Bourne, K. C.
*Boyd, H. W. K.
*Branagan, Thomas W.
Burgoine, R. C.
Burton, Keith
Christopherson, A. G.
Cina, Alan J.
Coles, Kenneth D.
Cunningham, I. R.
Dale, Albert
*Davis, Thomas W.
Delany, Patrick T. C.
Dodd, Geoffrey B. D.
Edwards, Ronald
Elborn, Arthur J.
Elliott, P. A.
Evans, Dudley M.
Fairley, Graham
Fawcett, James A.
Fenner, W. L.
Ferguson, Morris H.
Fisher, G. J.
Foden, John W.
Francis, M. R.
Gabb, M. J.
*Garratt, K. N.
Gibson, E. M. (Miss)
Gissing, G. E. J.
Gooday, L. H.
Gray, John
Green, Alan
Grime, William H.
Hallsworth, M. E.
Hance, D. R.
Hardinge, D. W.
Harrison, Henry P.
*Hesford, Arnold
*Hill, Geoffrey R.
Holt, Arthur P.
Jones, Felix A.
Jordan, Leslie
Kellaway, S. A.
Kerr, Thomas F.
Kidby, C. R. E.
Kirkwood, James
Law, M. O. (Miss)
Little, Arthur
Little, C. M.
McArthur, J. D.
Masters, P. H.
Meek, J. E.
Middleton, Peter
Middleton, Terence J.
Moore, Colin A.
Morgan, K. A.
*Norris, J. G.
Nunney, J. C. (Miss)
Ormshaw, Edward H.
*Pack, W. C.
Pankhurst, G. W. A.
Park, Peter
Peake, J. S.
Peddie, M. P.
Phizacklea, Edmund R.
Pillinger, George D.
Preston, P. E.
Prodgers, C. H.
*Ramsay, William
Rice, Beatrice M. (Miss)
*Riding, Joseph W.
Robertson, Richard G.
Scales, L. S. B.
Scott, K. M.
*Shaw, Percy A.
*Shaw, W. J. R.
*Skipper, E. J. G.
*Slattery, L. T.
Sleight, Harry
Snell, J. S. Saxon
Souter, A. E.
Spenceley, Peter J.
Stanford, Alec A.
Sunderland, Maurice
Talbot, Edward R.
Tavill, Dennis
*Thomas, Joseph F. K.
Thomson, Ronald G.
Todhunter, S. E. (Miss)
Toohill, Leonard
*Trim, R. S.

*Trinder, V. W.	Ward, John
Turner, Geoffrey	Warner, Ivor
Usher, Edward W.	Watt, Barbara V. (Miss)
Vaughan-Ellis, G. R.	Wheeler, Harry A.
Vick, F. N. H.	White, Harold
*Wadsworth, James E.	Wingrove, Noel
Wagner, A. A. W.	*Woods, Ian R. J.
Wainwright, Allan	Wraight, J. R.
Walker, Brenda A. (Miss)	Wright, Alan J.
Walker, Howard V.	*Wright, G. W. H.
Wallace, Kenneth G.	Yeatman, D. G.

* Subject to the approval of History Thesis or Theses.

The following candidates have also completed their qualifications and have now passed the Intermediate Examination :—

Mulhall, B. White, Anthony E.

ALLIED SOCIETIES

Berks., Bucks. and Oxon Architectural Association Annual Dinner

The seventeenth annual and first post-war dinner of the Berks., Bucks. and Oxon. Architectural Association was held at High Wycombe on 6 December 1946 and was attended by ninety-seven members and guests of the Association, including the President, Sir L. H. Keay, K.B.E., Mr. Cyril F. Martin, M.C., M.A. (V.-P.) and the Secretary, R.I.B.A., Mr. C. D. Spragg. Mr. R. C. Brocklehurst, President of the Berks., Bucks. and Oxon. Association, was in the chair.

Mr. Martin proposed the toast of The Berks., Bucks. and Oxon. Association and said that unity in the profession was never more necessary than at present, when wise guidance in the intricate rebuilding problems facing the nation was urgently required and that such unity of purpose and interest found its expression in the loyalty and support given by the Allied Societies and Associations to the central Institute. Mr. Brocklehurst, in replying to Mr. Martin's toast, expressed his pleasure on behalf of the members and guests, at the President's presence. Mr. Lawrence Dale proposed the toast of the R.I.B.A. and the President, Sir L. H. Keay, replied. He instanced High Wycombe, the town in which they were met, as " an example of some of the ideals of the English people." He continued : " It might be said that your High Street has higgledy-piggledy architecture, that none of it quite matches its next door neighbour. Nevertheless it has the individuality which is a characteristic of the British and which we are at the present time in danger of losing." Urging his audience to instil in the British people a knowledge of the value of the fine arts, the President said he looked with considerable dread to a world where everything was standardised. Individuality should be maintained and given full play. If this were done a finer and better England would be built.

Birmingham and Five Counties Architectural Association Annual Dance

The Annual Dance of the Birmingham and Five Counties Architectural Association will be held at The Botanical Gardens, Edgbaston, Birmingham, on Friday, 31 January, from 8 p.m. to 1 a.m. Admission by ticket only, price 10s. 6d. including buffet supper. Applications for tickets, accompanied by a remittance, should be sent to the Secretary, B. & F.C. A.A., 8 Newhall Street, Birmingham, 3. The rules of the Botanical Society restrict the number to 250 and applications will therefore be dealt with in strict rotation.

COMPETITIONS

Proposed Technical College : Peterborough

Peterborough Joint Education Board invite architects of British nationality to submit in open competition designs for new buildings to be erected at Peterborough for a technical college.

Assessor : Mr. T. Cecil Howitt, D.S.O. [*F.*].

Premiums : £500, £250 and £150.

Last day for submitting designs : 30 June 1947.

Last day for questions : 28 February 1947.

Conditions may be obtained on application to the Chief Education Officer, Education Offices, Peterborough.

Deposit : £2 2s.

Village Planning Competition

The Central Landowners' Association invites architects to submit, in competition, designs for the development of four villages.

Assessors : Prof. Sir Patrick Abercrombie, P.P.T.P.I. [*F.*] ; Mr. G. Langley-Taylor, M.T.P.I., F.S.I., F.L.A.S. [*F.*] ; Mr. Thomas Rayson, F.S.A. [*F.*].

Premiums : £250, £200, £150 and consolation prize (or prizes) of £100.

Last day for submitting designs : 30 June 1947.

Last day for questions : 28 February 1947.

Conditions may be obtained on application to the Central Landowners' Association, 58 Victoria Street, S.W.1.

Deposit : one guinea.

Competition for the Extension of the Fife County Council Buildings

The County Council of Fife invite architects of British nationality resident in Scotland to submit designs for alterations and extensions of County Buildings, Cupar, Fife.

Assessor: Mr. A. G. R. Mackenzie [*F.*].

Premiums: £500, £300 and £200.

Last day for submitting designs: 31 March 1947.

Conditions may be obtained on application to J. M. Mitchell, Esq., County Clerk, County Buildings, Cupar, Fife.

Deposit, one guinea.

GENERAL NOTES

A.S.B. Lecture at the R.I.B.A.

Wednesday, 5 February 1947, at 6 p.m.

Noise and the New Planning—Mr. Hope Bagenal, D.C.M. [*F.*]

Synopsis

Assessing of noise risks. Noise and nuisance. The regional noise source. Aerodrome. Testing shed. Shunting yard. Zoning and safe distances. Possibilities of reduction at source. The local noise source. Segregation—the " Special Industries " zone. Control—permit for every industry. Weeding out and gradual transference. The old sandwich city. Residential areas and noise sources. Traffic. The four classes of road railways. Local services. Schools. Dogs. Recreational buildings. The Dirt Track. Means of regulating and defining permissable noise. Background noise and types of property. Rights of educated persons. Quiet blocks. Flats and their problems. Business zones. Siting of city buildings. The integrated plot. Tower buildings. Housing and noise—a perspective view.

Architectural Association Scholarships in Architecture

The Council of the Architectural Association offers the following scholarships in architecture :—

ENTRANCE SCHOLARSHIPS

The Leverhulme Scholarship*. Value £200 per annum.

The Minter Open Entrance Scholarship. Value £90.

The Sir Walter Lawrence Open Entrance Scholarship. Value £90.

The Metal Window Scholarship (presented by The British Metal Window Manufacturers' Association, Ltd.). Value £75 per annum.

The Natural Asphalte Council Scholarship (presented by The Natural Asphalte Mine-Owners and Manufacturers' Council). Value £50 per annum.

The Northern Aluminium Scholarship (presented by The Northern Aluminium Company). Value £50 per annum.

The Patent Glazing Scholarship (presented by The Patent Glazing Conference). Value £50 per annum.

These Scholarships, which are tenable for five years at the A.A. School of Architecture, will be available to students of British nationality. They will be awarded for one year, with the intention that they shall be renewed from year to year until the student has completed the course ; renewal being subject to a satisfactory report of the student's progress, and to proof of the continued need for such assistance.

SENIOR ENTRANCE SCHOLARSHIP

The Metal Window Senior Scholarship (presented by The British Metal Window Manufacturers' Association, Ltd.). Value £50 per annum.

This Scholarship, which is tenable for two years at the A.A. School of Architecture, is open to students of British nationality, who have passed the Intermediate Examination of the R.I.B.A., either externally or at another Recognised School of Architecture, and is for entry to the fourth year of the course, and subject to satisfactory progress by the student, will be renewed for the fifth year.

Full particulars and forms of application may be obtained from the Secretary of The Architectural Association, 36 Bedford Square, London, W.C.1., and forms of application should be received not later than 1 April 1947, for all except* (1 June 1947).

Festival of St. Luke the Evangelist

We are indebted to Mr. Frank Salisbury, the well-known painter for the loan of the block illustrating Colin de Coters' picture of *St. Luke painting the Virgin*, which appeared on page 85 of the December 1946 R.I.B.A. Journal.

CORRESPONDENCE

The Daylighting of Class Rooms Under the New Regulations

To the Editor, JOURNAL R.I.B.A.

SIR,—The article under the above title in the September JOURNAL stated that the object of the Ministry of Education in drastically reducing the recommendations as to the natural lighting of class rooms in the D.S.I.R. report on Lighting, was to render the new Regulations applicable to new and existing buildings. The authors complain that they are prevented from replying to the suggestion that this object has not been attained by lack of explicit reasons.

The omission is due to the tacit assumption in my letter that to any architect accustomed to design schools with due regard to reasonable economy in first cost and in that of subsequent heating, combined with educational efficiency, the novel expedient of completely glazing both sides of class rooms and corridors in order to render the Regulations applicable to multi-storey schools, with the alternative of lower stories 14 to 15 feet high, would be obviously impracticable or impossible in either new or existing buildings. Be that as it may, there can be no doubt as to the expense, both in first cost and maintenance, of the huge windows called for by the new Regulations, and the gravamen of my case was the complete absence of ophthalmic or physiological evidence of any necessity at all for altering the well-tried pre-war practice, which has given rise to no complaints over many years ; and my plea was for due investigation before public funds were involved.

It is not a matter of single schools or even of a few schools, but of a very material factor in the total cost of a vast building programme which is estimated officially to involve an expenditure of £1,030,000,000 over the next 15 years, all of which must be paid for out of rates and taxes.

Yours faithfully,

PERCY J. WALDRAM [*L.*].

To the Editor, JOURNAL R.I.B.A.

SIR,—Had there been no evidence suggesting that pre-war lighting of schools was in any way deficient, the Lighting of Buildings Committee would not have felt impelled to make recommendations for improvement.

Mr. Waldram says there is no ophthalmic evidence, but in the Report of the Chief Medical Officer of the Board of Education, 1937, p. 51, attention is drawn to the fact that the incidence of serious eyesight defects increases throughout the period of school life, though minor defects and other bodily ailments show a steady decrease. Eye defects affect about 25 per cent. of children at the age of leaving school. It was such evidence which compelled the Committee to interest itself seriously in the problem.

As to cost, not more than a few schools in awkward positions are likely to have to employ the extreme measures he describes ; most schools should be able to use the simpler measures described in our article, many of which involve little, if any, increase in glass area over what had become normal practice before the war.

Yours truly,

WM. ALLEN,
J. B. BICKERDIKE,
The Building Research Station.

Editor's Note : The subject of this correspondence is now closed.

"Modern Heating and the Architect"

To the Editor, JOURNAL, R.I.B.A.

SIR,—In summing up at the final session I involved myself in an awkward phrase about evidence *in favour of* so-and-so *not* being such-and-such. Very naturally the word "not" was dropped from the record. In the interest of accuracy I must trouble you to make it plain that the weight of evidence was *against* "background heating plus topping-up" as an economical proposition when compared with full heating.

Yours faithfully, M. HARTLAND THOMAS [*F.*].

Architectural Terms

To the Editor, JOURNAL R.I.B.A.

SIR,—May I be allowed to utter a little squeak of protest against the earnest planners, who may be able to call a spade a spade, but have to call a fire a "space-heating appliance," keeping out damp "prevention of moisting penetration" and so on ? Quite a small percentage of the spate of verbiage which is poured forth in the name of architecture to-day has any value—but surely the high-water mark of humourlessness has recently been reached in the solemn suggestion that in the house of the future (it cannot be honoured with the name of home) the television set will provide the "focal unit"—round which no doubt the good citizens will warm their minds at cultural propaganda as laid on from Whitehall.

Yours faithfully, CHRISTOPHER JACOBS [*A.*].

New Year Nonsense

The following has been received from a solicitor who wishes to remain anonymous :—

To the Editor, JOURNAL R.I.B.A.

SIR,—You will be interested to learn that as a result of the decision in the case of Smith *v.* Jones *et al*, there is a quite unique case pending in the P.D. & A. division (no, *not* Pubs, Drink and Arson). It arises out of the application by the unpaid solicitor to the plaintiff, Smith, who asks for grant of administration with the will annexed to the estate of Smith with a view to the Administration of the Estate in Bankruptcy in the hope of recovering some part of his costs. The only asset is an offer to purchase Smith's pseudo-architectural designs which has been received from a modernistic pottery concern which proposes to use them as inspiration for domestic crockery.

The application is naturally based on the legal presumption of the death (and/or non-life) of Smith contained in the Judgment in the case so admirably reported in your JOURNAL. The real point of interest, however, arises from the fact that a caveat has been entered by Smith. It is, so I am told, the first case in which a caveat against grant of Probate or Administration has been entered by the Testator himself. Smith alleges that while he cannot contest the validity of the Judgment as to his non-life for the past 50 years, he was alive 51 years ago, when, while playing at soldiers at the age of 15, he made a holograph will giving all he possessed to himself. He propounds the will and claims grant of administration to himself.

The case is expected to go to the House of Lords and *may* be removed by writ of incertiorari to Bedlam.

I am, Sir, etc.,

OBITUARIES

Colonel Charles Richard Bayly Godman [*F.*]

It is with regret that we record the death of Col. C. R. B. Godman on 30 October 1946, at the age of 67. He was trained at the Architectural Association School of Architecture and practised mainly in Horsham, where he designed banks and domestic undertakings. He practised in partnership with Mr. C. J. Kay [*F.*] under the style of Godman & Kay from 1921 to 1935 and from 1935 to 1944 they both practised under that style but with Mr. L. H. Parsons [*A.*] as an additional partner. The firm continues in the name of Godman & Kay and will be carried on by Mr. C. J. Kay [*F.*], Mr. L. H. Parsons [*A.*] and Mr. N. F. Gossage [*A.*].

Col. Godman was a member of the Council of the South-Eastern Society of Architects.

William Joseph Waghorne [*Ret. F.*]

We regret to record the death of Mr. William Joseph Waghorne on 19 November 1946, at the age of 78. He was for some years Chief Architect to the East Indian Railway and designed the Howrah Station, Calcutta, and the South Indian Railway Station, Madras. He was also on the staff of the Chief Architect, Great Western Railway, Paddington, for seventeen years up to his retirement in 1937.

Walter Henry Woodroffe [*F.*]

Mr. Walter H. Woodroffe, the senior partner in the firm of W. H. Woodroffe & Son, London, died on 12 December 1946, at the age of 85. He was trained at the Royal Academy School and commenced private practice in London, 1885, eventually taking his son, Mr. N. F. Woodroffe, O.B.E. [*F.*] into partnership in 1921.

He was responsible for the building of the Head Offices, National Union of Teachers, Hamilton House, John Groom's Crippleage, Edgware, many Bank branch premises and commercial and domestic work in London and Greater London, as well as being surveyor to several estates.

Frederick Marshall Dryden [*F.*]

We regret to record the death of Mr. F. M. Dryden, of Newcastle-on-Tyne. He died on 13 November 1946 at the age of 76. He was articled to Mr. William Glover [*F.*] at Newcastle-on-Tyne and commenced private practice in 1901. He was in partnership with Mr. J. E. Shaw from 1913 to 1942 and they were responsible for schools, country houses, industrial works, municipal omnibus garages and estate development in the North of England.

Henry Francis Kerr [*Ret. A.*]

The death occurred at his home in Edinburgh on 2 November 1946 of Mr. Henry Francis Kerr, the well-known Edinburgh architect and an acknowledged authority upon Old Edinburgh. Mr. Kerr, who was in his 92nd year, was a son of Mr. Andrew A. Kerr, an Edinburgh banker, and was educated at Hunter's School, at Edinburgh Academy, which he entered in 1866, and at the Edinburgh University. Apprenticed to the architectural firm of Pilkington & Bell when he was 18, he had practised on his own account since 1881, having been responsible for a great deal of domestic work in Edinburgh, as well as for the restoration of the Kirk of Greyfriars.

He was keenly interested in historical architecture and particularly in the old buildings of his native city. Mr. Kerr wrote several treatises upon Old Edinburgh and was an acknowledged scholar of this subject, as well as lecturing to professional and other bodies. He contributed largely to the transactions of antiquarian societies like the Old Edinburgh Club, the Ecclesiological Society, the old Edinburgh Architectural Association and the Society of Antiquaries. He was a past president of the Edinburgh Architectural Association.

Mr. Kerr's other literary works included articles some years ago in the R.I.B.A. JOURNAL, the R.I.A.S. Quarterly, the Proceedings of the Society of Antiquaries of Scotland and the Proceedings of the Scottish Ecclesiological Society.

Mr. Kerr has been in ill health for some time but in March of this year a paper by him was read before the Old Edinburgh Club and showed characteristic freshness of treatment of his favourite architectural subject. His authorship of "Cardinal Beaton's Palace: Blackfriars' Wynd" (published 1943 for the Old Edinburgh Club) on historical Edinburgh, earned for him the title of doyen of Edinburgh antiquarians.

George A. Lansdown, J.P. [*F.*]

We have with regret to record the death of George A. Lansdown [*F.*] in his eighty-fourth year. His partner, Mr. Alan H. Devereux [*A.*] has sent the following appreciation:—

"In 1883 he became an articled pupil of Walter F. Harris [*A.*], R.I.B.A., and studied at the Architectural Association Schools. Later, in 1893, he went into partnership with his father, George Lansdown, and practised at 5-7 Warwick Street, S.W.1, thus carrying on a business originally established in 1859. During his early years he included in his duties those of District Surveyor for Southwark and his name is still well known in that borough—the association being renewed in 1939 when the firm of George Lansdown & Devereux were appointed as consultants to assist the Borough Council in their programme of providing air raid shelters for tenement buildings.

Mr. Lansdown's practice was a varied one, chiefly in London. He was responsible for the design and erection of several large blocks of flats, many factories and shop premises and a number of private houses. He also practised extensively as a surveyor, became an authority on the London Building Act and an expert on rating and valuation. He was keenly interested in the legal aspects of the profession, frequently acting as arbitrator in disputes. From 1913 to 1936 he was in partnership with Mr. W. E. A. Brown [*F.*], now deceased. Towards the end of his life, Mr. Lansdown devoted increasing time and zeal to public duties. He became Councillor of the Surveyors' Institute and served on numberous municipal and ministerial committees.

In addition, he was a devoted servant of the Royal Borough of Kensington, where he resided. He became a Councillor in 1906 and Alderman in 1926. Mr. Lansdown was also a Justice of the Peace of the County of London for nearly 20 years and a Freeman of the City.

Mr. Alan H. Devereux [*A.*] joined him in partnership in 1938, not long after the death of Mr. W. E. A. Brown. When Mr. Devereux was absent on military service during the last war, Mr. Lansdown, continued the practice, despite his increasing years.

Despite his many and varied activities he had a true Englishman's love of sport. As far back as 1880, or thereabouts, he was captain of Merton Rugby Football Club and later in life was a keen golfer. He was held in great affection by his clients, friends and associates and his death has brought many expressions of sympathy and regret from those who knew him."

Albert Leslie Knott [*A.*]

Mr. Albert Leslie Knott, who died on 31 October 1946, was born in 1889. He was trained at the Regent Street, Polytechnic and London University. He was never in private practice but designed shops, flats and domestic assignments for Messrs. Haymills, of Hendon, by whom he was employed from 1923 to 1929, and for the Dagenham Borough Council from 1929 to 1943. In his employment by the Dagenham local authority he was responsible for architectural work in connection with housing estates, three public libraries, a swimming bath and the Cemetery chapel, all in the Dagenham Council's area.

William Harding Thompson [*Ret. F.*]

AN APPRECIATION BY DR. H. V. LANCHESTER [*F.*]

"It is with very great regret that we have to record the death on 3 November 1946 of Mr. William Harding Thompson, M.C. [*F.*], P.P.T.P.I., at the relatively early age of 58. It is sad to note that a career still full of possibilities for the future has now been terminated.

Mr. Thompson's early studies at Giggleswick School led up to the London University, where he took the diploma in Town Planning, continuing his technical studies at the Liverpool School of Architecture where he was Lever prizeman and gained the Holt Travelling scholarship, devoting this to study at the British School in Rome. The outbreak of war in 1914 interrupted his professional activities and he served with the Honourable Artillery Company and the Royal Field Artillery. After the war he was appointed a lecturer by the Architectural Association, where his exposition of the various aspects of Town Planning were greatly appreciated. He was at this time engaged on the Enham (Hampshire) Village Centre for Disabled ex-Servicemen, and subsequently carried on a practice as architect and Town Planning Consultant.

He was technical advisor to the Regional Committee for Hertfordshire, Oxfordshire and Dorset and was responsible for many literary works, including books, with Geoffrey Clark on "Dorset," "Surrey," "Sussex" and "Lakeland," as well as other works on rural subjects. He was responsible for the Somerset Regional Survey. In 1939-40 he was President of the Town Planning Institute and during the late war served in the Royal Air Force Volunteer Reserve.

Harding Thompson's work for town planning was characterised by clear thinking and his proposals were always supported by a reasoned argument and a tactful approach to difficult questions so that even the few who disagreed with him were, in a measure, disarmed. It was unfortunate that two major wars took place within the thirty years of his practice and restricted his contribution to the art to which his life was devoted and for which he was so well equipped."

William Harold Watson [*F.*]

Mr. William Harold Watson, whose death took place at Wakefield, Yorkshire, on 11 November 1946, practised with his son, Mr. W. E. Watson, M.A. [*A.*], in King Street, Wakefield, as architects and surveyors. Mr. W. H. Watson was 69 years of age. Articled in the offices of his father, the late William Watson, of Wakefield, Mr. W. H. Watson practised from 1902 to 1913 with the late Mr. F. B. Ellison and on the death of Mr. Ellison in 1913 carried on the partnership as sole partner until the entry of his now surviving son, Mr. W. E. Watson, into the firm.

Mr. Watson designed, in Wakefield, the Lawfield Lane Schools, Thornes House School, the Technical College, the Golf Club House, The Grammar School War Memorial, the Nurses' Home, the Out-Patients' Department and the X-Ray Department at the Clayton Hospital and the White Rose Hospital. Among other designs, Mr. Watson built Messrs. G. Andertons' Mills at Cleckheaton, the Nurses' Home, Children's Block and Operating units at the Victoria Hospital, Keighley, and extensions to the Coronation Hospital at Ilkley, Yorkshire.

Mr. W. E. Watson [*A.*] will continue the practice for the time being under the style of "W. Harold Watson & Son."

Evan William Harkness [*A.*]

The death occurred in New Delhi, on 19 November 1946, of Evan William Harkness [*A.*]. Harkness, who was a native of New Zealand, had been working in the Ministry of Town and Country Planning during the war. He was appointed Town Planning Officer at New Delhi by the Government of India, and took up his duties there in November 1945, since which time he has been chiefly engaged on the preparation of a master-plan for the whole Delhi area. He is survived by a widow and two children, who have returned to New Zealand.

Edgar Charles Gentry [*A.*]

The death occurred in New Delhi on 5 December 1946 of Edgar Charles Gentry [*A.*].

After taking his degree in England, Gentry joined the staff of Sir Edwin Lutyens, as his assistant representative at New Delhi in November 1919, which appointment he held until 1930, when he joined the Central Public Works Department as architect. He was holding this post at the time of his death, having acted as consulting architect on a number of occasions.

Joseph Watson Cabré [*F.*]

Mr. Joseph Watson Cabré, a Liverpool member, died on 18 November, 1946, at the age of 62. He was trained at the University of Liverpool and was awarded a travelling studentship in 1906. As well as being in private practice in Liverpool he was at one time a lecturer at the Liverpool City Technical College. His literary works included the Planning and Design Section in the "Teach Yourself Building" Series (1945).

MEMBERS' COLUMN

This column is reserved for notices of change of address, partnership and partnerships vacant or wanted, practices for sale or wanted, office accommodation, and personal notices other than for posts wanted as salaried assistants for which the Institute's Employment Register is maintained.

APPOINTMENTS

MR. HERBERT BAINES [*L.*] has been appointed Chief Architectural Assistant to the Borough Engineer, Mitcham, Surrey.

MR. F. GLANVILLE GOODWIN [*A.*], formerly Head of the Technical School of Building Crafts, Corporation Street, Newcastle-on-Tyne, has now taken up an appointment as Head of the Senior Building and Evening School, Hammersmith School of Arts and Crafts, Lime Grove, London, W.12. He will be pleased to receive trade catalogues, etc.

MR. BRIAN B. LEWIS [*F.*], formerly Architect to the Great Western Railway, has proceeded to Australia to take up an appointment in the newly-established Chair of Architecture at Melbourne University.

MR. N. F. PEARCE [*A.*] has been appointed Deputy Borough Architect to the Walthamstow Corporation.

MR. VISHWA NATH PRASAD [*A.*] has been appointed Chief Architect and Town Planner to the Government of Bihar and would be pleased to receive trade catalogues, etc., at the Public Works Department, Patna, India.

PRACTICES AND PARTNERSHIPS

MR. A. H. BASTO [*A.*] has recommenced his practice at 3rd Floor Prince's Building, Ice House Street, Hong Kong, where he will be pleased to receive trade catalogues, etc.

MR. S. K. BHEDWAR draws attention to an error in the 1946-47 "Kalendar" concerning his membership. The double-dagger prefix should have appeared against his name on page 12. This abbreviation denotes, as is explained on page 5 of the "Kalendar," that the member has first passed an examination qualifying for candidature as Associate. Mr. S. K. Bhedwar passed the necessary examination and was elected an Associate in 1912 and a Fellow in 1923.

MR. R. FIELDING DODD [*F.*] has taken Mr. Ailwyn Best [*A.*] and Mr. Kenneth Stevens [*A.*] into partnership. They will practice under the style of R. Fielding Dodd, Best & Stevens, at 21 Turl Street, Oxford (Oxford 3008).

MR. FRANK GOLLINS [*A.*] and MR. JAMES MELVIN [*A.*] have entered into partnership and will practice under the style of Gollins, Melvin & Partners at 21 Russell Square, London, W.C.1 (Museum 0883), where they will be pleased to receive trade catalogues, etc.

MR. ANDREW L. GRAY [*A.*], of 2a Simpsons Road, Bromley, Kent, announces that his telephone number is Ravensbourne 2775.

MR. A. W. KENYON [*F.*] points out that his telephone number appearing in the 1946-47 "Kalendar" should read "Museum 7495."

MR. RONALD D. LYNDE [*L.*] and MR. A. H. C. GRIFFIN [*L.*] have entered into partnership and will practice under the style of Lynde and Griffin, 5 Budge Row, London, E.C.4 (City 7324). They will be pleased to receive trade catalogues, etc.

MR. S. W. MILBURN, M.B.E., M.C., T.D. [*F.*], has retired from the firm of W. & T. R. Milburn, practising at 17 Fawcett Street, Sunderland. Mr. S. W. Milburn is commencing practice in partnership with Mr. W. E. Dow [*A.*] and Mr. G. W. Smith [*L.*] at 18 Fawcett Street, Sunderland (Sunderland 2365) and at 3 Winchester Street, South Shields. They will practice under the style of S. W. Milburn and Partners and will be pleased to receive trade catalogues, etc.

MR. R. H. PASTAKIA [A] will be pleased to receive trade catalogues, etc., at Lakshmi Building, Sir Pherozshah Mehta Road, Fort, Bombay.

MESSRS. HUGH ROBERTS AND DAVIES [*F./A.*], 13 Suffolk Street, Haymarket, S.W.1 (Whitehall 2881-3), will be pleased to receive trade catalogues, etc.

MR. NORMAN ROYCE [*A.*] and MR. LAWRANCE A. BUTTERFIELD [*A.*], on release from the Forces, have recommenced practice at 8 Salisbury Court, London, E.C.4. (Central 7440) under the style of Royce, Butterfield & Partners. They will be pleased to receive trade catalogues, etc. A branch office has also been opened at Salisbury, Wilts.

MR. NOEL D. SHEFFIELD [*F.*] retired on 31 December 1946 from his partnership in the firm of Stock, Page & Stock, 18 St. Thomas's Street, London, S.E.1, but will continue to act as consultant. Mr. Sheffield has also relinquished his appointment as Surveyor to the Worshipful Company of Haberdashers which partners in his late firm have held for over a hundred years in unbroken succession. Mr. Terence C. Page [*F.*] has been appointed Surveyor to the Company so that the continuity will remain unbroken. Messrs. Stock, Page & Stock are taking into partnership Mr. James Maitland [*A.*] from 1 January 1947.

MR. F. HALLIBURTON SMITH [*F.*] and MR. P. RUSSELL WALKER [*A.*], who practice at 35 New Broad Street, London, E.C.2 (London Wall 4700), under the style of Adams Smith, Son & Walker, have taken into partnership Mr. Lionel S. Bailey, and will continue to practice under the same style name. Additional offices have been opened at "Peet Tye Cottage," Mersea Road, Peldon, Colchester (Peldon 264), and "Mayfields," Massett Road, Horley (Horley 794). They will be pleased to receive trade catalogues, etc.

MR. BASIL SUTTON [*F.*] has taken into partnership Mr. John Griffin [*A.*]. They will practise under the style of Sutton & Griffin at Baydon, Marlborough, Wiltshire (Aldbourne 82 and Ashbury 44), and will be pleased to receive trade catalogues, etc.

MR. B. F. G. WAKEFIELD [*F.*] has from 1 January 1947 taken into partnership his son, Mr. Peter L. H. Wakefield [*A.*], and the practice will be carried on as heretofore at 18 Orchard Street, Bristol (Bristol 21224). They will practise under the style of B. Wakefield & Son.

MESSRS. P. J. WESTWOOD & SONS [*F/A.A.*], practising at Nutfield Heath Road, Weybridge, Surrey, have re-opened a London office at 3 Raymond Buildings, Gray's Inn, London, W.C.1 (Chancery 8667), and will be pleased to receive trade catalogues, etc. The Weybridge office will be retained.

CHANGES OF ADDRESS

MR. A. G. BARBER [*A.*] has removed from "Cambon," Birdham Road, Chichester, to 55 Broughton Avenue, Aylesbury, Bucks. (Aylesbury 389).

MR. J. B. S. COMPER [*F.*] has removed from 36 Sloane Court, London, S.W.3, to Douglas House, 6 Maida Avenue, London, W.2 (Amb. 3309). He announces that trade representatives can be seen by appointment only.

MR. HEINZ DESSAU [*A.*] has removed to 4 Phillimore Court, High Street, Kensington, London, W.8 (Western 8326), and will be pleased to receive trade catalogues, etc., at that address.

MR. EDWIN H. EARP [*L.*] has removed from 48 Henley Street, Stratford-on-Avon, to Scholars Lane, Stratford-on-Avon (Stratford-on-Avon 3424).

MR. D. M. MICKLETHWAITE [*A.*] has removed to 3 Staverton Road, Oxford.

MR. ERIC SANDON [*A.*] has removed from Lord's Waste, Bredfield, Woodbridge, Suffolk, to 3, Market Hill, Woodbridge, Suffolk (Woodbridge 558).

MR. J. R. STAMMERS [*A.*] has removed to 34a Netherhall Gardens, London, N.W.3.

PRACTICES AND PARTNERSHIPS WANTED

ASSOCIATE (38) desires partnership in established practice in Leeds. Good experience in West Riding industrial work, housing, town planning, etc., including ten years in private practice before the war. Capital available if necessary and connections.—Apply Box 1, c/o The Secretary, R.I.B.A.

WANTED

WANTED BY MEMBER. (1) Books by W. Shaw Sparrow—"The Modern House," "Flats," etc. (2) Original drawings in colour by Harold Stevens (1906-1918). (3) "The Architectural Review," May 1925 (or volume containing same). (4) Batty Langley (Books), 1730.

ACCOMMODATION

ARCHITECT AND SURVEYOR [*F.*] requires office accommodation in Wareham or Swanage (Dorset) or might work in with another member. Apply Box 356, c/o The Secretary, R.I.B.A.

MEMBERS RELEASED FROM THE SERVICES, ETC.

The following members have notified the R.I.B.A. that they have been released from the Services and are resuming practice and would be pleased to receive trade catalogues, information sheets and other data, etc. :—

MR. A. G. BARBER [*A.*] (late R.E.), 55 Broughton Avenue, Aylesbury, Bucks. (Aylesbury 389).

MR. JOHN GRIFFIN [*A.*] (late Squadron Leader, R.A.F.), Baydon, Marlborough, Wiltshire.

MR. HOWARD W. M. SAGE [*A.*] (private address "Pine End," Upton Road, Chichester, Sussex), Chief Assistant Architect (Education) County Architect's Office, West Sussex County Council.

MR. BRIAN C. SHERREN [*F.*], "Deepdene," Gravelly Hill, Caterham, Surrey (Caterham 2131).